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FINAL MUNITIONS AND EXPLOSIVES OF CONCERN QUALITY ASSURANCE PROJECT
PLAN FOR UNEXPLODED ORDNANCE 20 (UXO 20) SAFETY THERMAL TREATMENT
POINT REMEDIAL INVESTIGATION NSWC INDIAN HEAD MD

06/01/2016
CH2M HILL

Worksheet #1—Title and Approval Page

Final

**Munitions and Explosives of Concern
Quality Assurance Project Plan for
UXO 20 – Safety Thermal Treatment Point Remedial Investigation**

**Naval Support Facility Indian Head
Indian Head, Maryland**

Contract Task Order JU05

June 2016

Prepared for

**Department of the Navy
Naval Facilities Engineering Command
Washington**

Under the

**NAVFAC CLEAN 8012 Program
Contract N62470-11-D-8012**

Prepared by



Herndon, Virginia

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Executive Summary

Introduction

CH2M HILL (CH2M) has been contracted by the Department of the Navy (Navy), Naval Facilities Engineering Command (NAVFAC) Washington to conduct an intrusive investigation of digital geophysical mapping (DGM) targets as part of a Remedial Investigation (RI) for munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH) at UXO 20, Safety Thermal Treatment Point, at Naval Support Facility Indian Head (NSFIH), Indian Head, Maryland. CH2M prepared this document under the NAVFAC Washington Comprehensive Long-Term Environmental Action Navy 8012 Contract N62470-11-D-8012, Contract Task Order JU05, for submittal to NAVFAC Washington, the U.S. Environmental Protection Agency Region III, and the Maryland Department of the Environment.

Background Information

A Preliminary Assessment (PA) for this site indicated the site covered approximately 1.6 acres and was located at the end of Old Burn Point Way on a peninsula that extends from the Main Installation into the confluence of the Mattawoman Creek and the Potomac River. The peninsula was built between approximately 1940 and 1942 and was set up for two separate uses: (1) a primary burn area, located from the tip of the peninsula to approximately 150 feet inland, which was used for open burning (OB) of munitions (cartridge-actuated devices [CADs] and propellant-actuated devices [PADs]); and (2) a secondary burn area, which covered the remainder of the peninsula, and was used for munitions testing, including deflagration-to-detonation testing and pierce testing. Testing and OB activities were conducted from the late 1940s to 1988. OB was conducted on the ground surface or in an open top, steel burn chamber in the primary burn area. A steel deflection shield also was used to prevent ejected materials from being projected beyond the OB area. UXO 20 also was reportedly used for OB/open detonation (OD) and testing of projectiles, bulk propellant, demolition charges, CADs and PADs primers, less-sensitive explosives, high explosives, and other pyrotechnics using in-ground pits.

Since the PA, the current boundary of UXO 20 has been adjusted to account for varying site conditions and active testing conducted at the northern portion of the Safety Thermal Treatment Point. The current boundary includes the southern part and spits (recent [since the PA] sediment deposition areas) of the peninsula and encompasses approximately 0.97 acre. In 2014, a DGM survey was completed across approximately 0.53 acre of this 0.97-acre area to detect metal potentially associated with MEC/MPPEH in the subsurface and to evaluate the lateral extent of identified targets within the survey area. A total of 507 geophysical targets were identified in the 2014 DGM survey, and 479 were identified as potentially representing MEC/MPPEH in the subsurface. The team agreed to intrusively investigate 213 targets to characterize the proportion of munitions-related items to non-munitions related items. This Quality Assurance Project Plan (QAPP) outlines the intrusive investigation for the 213 targets. Environmental sampling is covered under a separate Uniform Federal Policy (UFP) Sampling and Analysis Plan (SAP) (CH2M, 2012).

Throughout this document, UXO 20 refers to the area in the southern part of the peninsula encompassed by the new site boundary, and “peninsula” refers to both the northern and southern parts of the peninsula (the old site boundary in the PA).

Proposed Field Activities

The objective of this intrusive investigation is to characterize, above the groundwater table, the nature and vertical extent of the DGM anomaly sources for 213 targets selected for intrusive investigation. This information will be used to evaluate the proportion of munitions-related items to non-munitions-related

items within the target population identified during the 2014 DGM survey at UXO 20. This information also will be used to perform an explosive safety hazard assessment for MEC/MPPEH using the MEC Hazard Assessment Guidance to evaluate the remedial and removal alternatives, and determine whether further action at the site is warranted.

The intrusive investigation will be performed in accordance with a Naval Ordnance Safety and Security Activity (NOSSA)-endorsed and Department of Defense Explosives Safety Board-approved Explosives Safety Submission (ESS).

This MEC QAPP is intended to be the primary work plan for the activities being performed at UXO 20 and serves as a guide for the field activities and data quality assessment. Standard operating procedures are provided as Appendix A. The Accident Prevention Plan (APP) including the Site-specific Safety and Health Plan (SSHP) are provided as Appendix B.

This MEC QAPP was developed in accordance with the following guidance documents:

- *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, QAMS (EPA, 2002)
- *Uniform Federal Policy for Quality Assurance Project Plans* (EPA, 2005)
- *EPA Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006)

This document consists of 37 worksheets, which are based on the September 2009 MEC UFP-QAPP format (Navy, 2009). Worksheets that are not applicable to MEC/MPPEH characterization (for example, worksheets specific to sampling and chemical analysis) have been designated as “Not Applicable.” All tables are embedded within the worksheets, and figures are included at the end of each worksheet, where applicable.

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Abbreviations and Acronyms

3R	Recognize, Retreat, Report
AM	Activity Manager
APP	Accident Prevention Plan
AQM	Activity Quality Manager
bgs	below ground surface
CA	corrective action
CAD	cartridge-actuated device
CH2M	CH2M HILL
CSM	conceptual site model
DDESB	Department of Defense Explosives Safety Board
DFOW	definable feature of work
DGM	digital geophysical mapping
DQO	data quality objective
EADA	elevated anomaly density area
ECP	entry control point
EPA	U.S. Environmental Protection Agency
ESQD	explosive safety quantity distance
ESS	Explosives Safety Submission
EZ	exclusion zone
FCR	Field Change Request
FP	Follow-up Phase
FTL	Field Team Leader
GIS	geographic information system
GPS	global positioning system
GSV	Geophysical System Verification
HERO	hazards of electromagnetic radiation to ordnance
HSM	Health and Safety Manager
IAW	in accordance with
ID	identification
IHIRT	Indian Head Installation Restoration Team
IR	Installation Restoration
IP	Initial Phase
ISO	industry standard objects
IVS	Instrument Verification Strip
LCS	laboratory control sample
MDAS	material documented as safe
MDE	Maryland Department of the Environment
MEC	munitions and explosives of concern
mm	millimeter
MPPEH	material potentially presenting an explosive hazard
MPC	measurement performance criteria

MR	munitions response
MRP	Munitions Response Program
MRSIMS	munitions response site information management system
mV	millivolt
N/A	not applicable
NAD83	North American Datum 1983
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NIRIS	Navy Installation Restoration Information System
NOSSA	Naval Ordnance Safety and Security Activity
NSFIH	Naval Support Facility Indian Head
OB	open burning
OD	open detonation
ORR	Operational Readiness Review
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAD	propellant-actuated device
PAL	project action limit
PLS	Professional Land Surveyor
PM	Project Manager
POC	point of contact
PP	Preparatory Phase
PQO	project quality objective
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCA	root cause analysis
RI	Remedial Investigation
RPM	Remedial Project Manager
RRR	Recognize, Retreat, Report
RTK	real-time kinematic
SI	Site Inspection
SOP	standard operating procedure
SSC	site safety coordinator
STC	Senior Technical Consultant
SUXOS	Senior Unexploded Ordnance Supervisor
TBD	to be determined
UFP	Uniform Federal Policy
UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer

Worksheet #2—QAPP Identifying Information

Site Name/Number: Safety Thermal Treatment Point /UXO 20

Operable Unit: Not Applicable (N/A)

Contractor Name: CH2M HILL (CH2M)

Contract Number: N62470-11-D-8012, Contract Task Order JU05

Contract Title: Comprehensive Long-term Environmental Action Navy 8012

- **This Quality Assurance Project Plan (QAPP) was prepared in accordance with (IAW) the requirements of the following U.S. Environmental Protection Agency (EPA) documents:**

- *Uniform Federal Policy – Quality Assurance Project Plans* (EPA, 2005)
- *Guidance for Quality Assurance Project Plans (QAPPs) USEPA QA/G-5, QAMS* (EPA, 2002)
- *EPA Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA, 2006)

- **Identify regulatory program:**

Comprehensive Environmental Response, Compensation, and Liability Act of 1980

- **This QAPP is specific to:**

This is a project-specific QAPP for the Remedial Investigation (RI) activities at UXO 20, Naval Support Facility Indian Head (NSFIH) in Indian Head, Maryland.

- **List dates of scoping sessions that were held:**

Scoping Session	Date
Indian Head Tier I conference call	9/21/2015

- **List dates and titles of any QAPP documents written for previous site work that are relevant to the current investigation:**

Title	Author/Date
Final Munitions Investigation Work Plan for Land Sites UXO 6, UXO 9, UXO 11, UXO 20, and UXO 30; and Water Site UXO 27 NSFIH, Indian Head, Maryland	CH2M/2010
Final Remedial Investigation Work Plan for UXO 20 – Safety Thermal Treatment Point	CH2M/2012

- **List organizational partners (stakeholders) and connection with lead organization:**

Maryland Department of the Environment (MDE) – regulatory stakeholder

EPA Region III – regulatory stakeholder

- **Lead organization (see Worksheet #7 for detailed list of data users):**

Department of the Navy (Navy) – Lead Agency

Worksheet #2—QAPP Identifying Information (continued)

8. If any required QAPP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted QAPP elements and provide an explanation for their exclusion below:

The worksheets that are not applicable to this munitions and explosives of concern (MEC) format of the Uniform Federal Policy (UFP) QAPP are listed in the table below. These worksheets pertain to samples that are collected from the site and sent to an analytical laboratory. Because this phase of the project does not involve collecting samples from the site, there is no information to enter into these worksheets. These worksheets are designated as “Not Applicable” in the document.

UFP-QAPP Worksheet #	Required Information	Included or Excluded
A. Project Management		
Documentation		
1	Title and Approval Page	Included
2	Table of Contents QAPP Identifying Information	Included
3	Distribution List	Included
4	Project Personnel Sign-off Sheet	Included
Project Organization		
5	Project Organizational Chart	Included
6	Communication Pathways	Included
7	Personnel Responsibilities and Qualifications Table	Included
8	Special Personnel Training Requirements Table	Included
Project Planning/Problem Definition		
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	Included
10	Problem Definition, Site History, and Background. Site Maps (historical and present)	Included
11	Site-Specific Project Quality Objectives (PQOs)	Included
12	Measurement Performance Criteria Table	Included
13	Sources of Secondary Use Data and Information Secondary Use of Data Criteria and Limitations Table	Included
14	Summary of Project Tasks	Included
15	Reference Limits and Evaluation Table	Excluded
16	Project Schedule/Timeline Table	Included

Worksheet #2—QAPP Identifying Information (continued)

UFP-QAPP Worksheet #	Required Information	Included or Excluded
B. Measurement Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	Included
18	Sampling Locations and Methods/ Standard Operating Procedure (SOP) Requirements Table Sample Location Map(s)	Excluded
19	Analytical Methods/SOP Requirements Table	Excluded
20	Field Quality Control (QC) Sample Summary Table	Excluded
21	Project Sampling SOPs References Table Sampling SOPs	Included
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	Included
Analytical Tasks		
23	Analytical SOPs Analytical SOP References Table	Excluded
24	Analytical Instrument Calibration Table	Excluded
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	Excluded
Sample Collection		
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	Excluded
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification (ID) Example Chain-of-Custody Form and Seal	Excluded
QC Samples		
28	QC Samples Table Screening/Confirmatory Analysis Decision Tree	Excluded
Data Management Tasks		
29	Project Documents and Records Table	Included
30	Analytical Services Table Analytical and Data Management SOPs	Excluded

Worksheet #2—QAPP Identifying Information (continued)

UFP-QAPP Worksheet #	Required Information	Included or Excluded
C. Assessment Oversight		
31	Planned Project Assessments Table Audit Checklists	Included
32	Assessment Findings and Corrective Action (CA) Responses Table	Included
33	Quality Assurance (QA) Management Reports Table	Included
D. Data Review		
34	Verification (Step I) Process Table	Included
35	Validation (Steps IIa and IIb) Process Table	Included
36	Validation (Steps IIa and IIb) Summary Table	Included
37	Usability Assessment	Included

Worksheet #3—Distribution List

Name of QAPP Recipients	Title/Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address
Joseph Rail	Remedial Project Manager (RPM)	NAVFAC Washington	(202) 685-3105	joseph.rail@navy.mil
Mike Green	Munitions Response Program (MRP) Quality Assurance Officer	NAVFAC Atlantic	(757) 322-8108	mike.green@navy.mil
Andrew Louder	Installation Restoration (IR) Program Project Manager (PM)	NSFIH	(301) 744-2263	Andrew.louder@navy.mil
Robert Thomson	RPM	EPA Region III	(215) 814-3357	Thomson.bob@epa.gov
Curtis DeTore	RPM	MDE	(410) 537-3791	Curtis.detore@maryland.gov
Margaret Kasim	Activity Manager (AM) and PM	CH2M	(703) 376-5154	margaret.kasim@ch2m.com
John Tomik	Activity Quality Manager (AQM)	CH2M	(757) 671-6259	john.tomik@ch2m.com
George DeMetropolis	Munitions Response (MR) Safety and Quality Manager	CH2M	(619) 564-9627	george.demetropolis@ch2m.com
Matthew Barner	Project Geophysicist	CH2M	(704) 543-3273	Matthew.barner@ch2m.com
Nelson Figeac	Senior Unexploded Ordnance Supervisor (SUXOS)	CH2M	(757) 288-0374	nelson.figeac@ch2m.com
To be determined (TBD)	UXO Quality Control Specialist (UXOQCS)/UXO Safety Officer (UXOSO)	CH2M	TBD	TBD
Chuck Harrell	Vegetation Clearing Subcontractor Project Manager	Clearfield MMG, Inc. (Clearfield)	(757) 620-7057	charrell@clearfieldmmg.com
Doug Ralston	MEC Subcontractor Project Manager	USA Environmental, Inc. (USAE)	(813) 343-6368	dralston@usatampa.com
Tristan Stewart	Professional Land Surveyor (PLS) Subcontractor Project Manager	Bowman Consulting (Bowman)	(443) 837-3779	tstewart@bowmanconsulting.com

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Worksheet #4—Project Personnel Sign-Off Sheet

Organization: CH2M

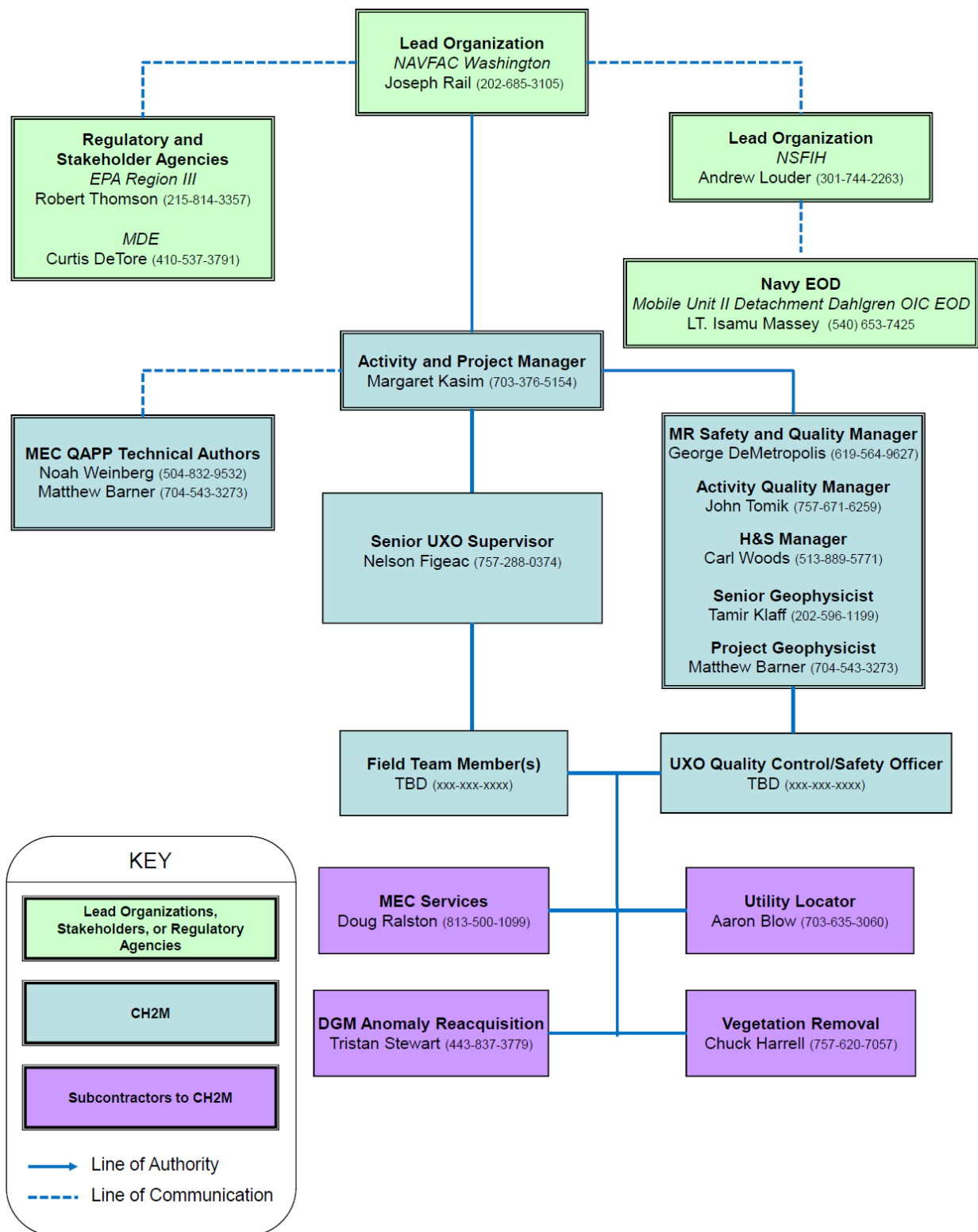
Name	Title/Role	Telephone Number (optional)	Signature/E-mail Receipt	Date QAPP Read
Margaret Kasim	AM and PM	(703) 376-5154		
John Tomik	AQM	(757) 671-6259		
Carl Woods	Health and Safety Manager (HSM)	(513) 889-5771		
George DeMetropolis	MR Safety and Quality Manager	(619) 564-9627		
Matthew Barner	Project Geophysicist	(704) 543-3273		
Nelson Figeac	SUXOS	(757) 288-0374		
TBD	UXOQCS and UXOSO	TBD		

Organization: Subcontractors

Name	Title/Role	Telephone Number (optional)	Signature/E-mail Receipt	Date QAPP Read
Chuck Harrell	Vegetation Clearing Subcontractor Project Manager	757-620-7057		
Doug Ralston	MEC Subcontractor Project Manager	(813) 343-6368		
Tristan Stewart	PLS Subcontractor Project Manager	(443) 837-3779)		

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Worksheet #5—Project Organizational Chart



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Worksheet #6—Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Telephone Number and/or Email	Procedure
Communication with Navy (lead agency)	RPM - Navy	Joseph Rail	(202) 685-3105 joseph.rail@navy.mil	<ul style="list-style-type: none"> Primary point of contact (POC) for Navy. Delegates communication to other internal or external POCs. Notifies EPA and MDE via email within 24 hours of field changes affecting the scope or implementation of the fieldwork. Participates in the onboard review discussion.
Communication with NSFIH	IR Program PM - NSFIH	Andrew Louder	(301) 744-2263 Andrew.louder@navy.mil	<ul style="list-style-type: none"> Primary POC for NSFIH. Delegates communication to other internal or external POCs. Will be provided with daily reports of all field activities. If field issues occur that affect the mission of the facility, the IR Program PM or his delegated personal should be notified immediately. Participates in the onboard review discussion.
Communication with EPA (regulatory agency)	RPM -EPA	Robert Thomson	(215) 814-3361 Thomson.bob@epa.gov	<ul style="list-style-type: none"> Primary POC for EPA. Delegates communication to other internal or external POCs. Has 60 days for MEC QAPP review. Participates in the onboard review discussion. Upon notification of field changes, EPA will have 24 hours to approve or comment on the field changes.
Communication with MDE (regulatory agency)	RPM - MDE	Curtis DeTore	(410) 537-3791 Curtis.detore@maryland.gov	<ul style="list-style-type: none"> Primary POC for MDE. Delegates communication to other internal or external POCs. Has 60 days for MEC QAPP review. Participates in the onboard review discussion. Upon notification of field changes, MDE will have 24 hours to approve or comment on the field changes.
Communication regarding overall project status and implementation and primary POC with Navy RPM, EPA, and MDE	AM – CH2M	Margaret Kasim	(703) 376-5154 Margaret.Kasim@ch2m.com	<ul style="list-style-type: none"> Primary POC for CH2M Forwards all relevant information and materials about the project to Joe Rail (NAVFAC Washington), Dennis Orenshaw (EPA), and Curtis DeTore (MDE). Oversees the overall project status.

Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Telephone Number and/or Email	Procedure
Technical communications for project implementation and data interpretation	AQM – CH2M	John Tomik	(757) 671-6259 John.Tomik@ch2m.com	<ul style="list-style-type: none"> To be contacted regarding questions/issues encountered in the field, input on data interpretation, as needed. Reviews the data as necessary before Indian Head Installation Restoration Team (IHIRT) discussion.
Communications regarding project management and implementation of all project phases, and primary POC with Navy RPM	PM – CH2M	Margaret Kasim	(703) 376-5154 margaret.kasim@ch2m.com	<ul style="list-style-type: none"> Forwards all information and materials about the project to Navy RPM on a daily basis. Oversees the overall project status. Is informed of project status by CH2M field personnel. If field changes occur during field activities, works with the Navy RPM to communicate field changes to IHIRT via email within 24 hours.
MEC QAPP implementation in the field	SUXOS – CH2M	Nelson Figeac	(757) 288-0374 Nelson.figeac@ch2m.com	<ul style="list-style-type: none"> Facilitates CH2M's internal communication (PM to field team members). Coordinates schedules and field activities with site visitors and subcontractors. Communicates with subcontractors by phone, followed up with e-mail to document decisions and actions. Identifies required significant changes to the MEC QAPP and generates a Field Change Request (FCR) to the PM for processing. Executes deviations after PM and Navy RPM approval. Implements project health and safety requirements. Reports near misses and incidents to the PM immediately by phone. Provides daily progress reports/updates to the CH2M PM by phone or email.
Field CAs	UXOQCS/ UXOSO - CH2M	TBD	TBD	<ul style="list-style-type: none"> The root cause analysis (RCA)/CA process will be undertaken, as needed, by the SUXOS and MR Safety and Quality Manager. The MR Safety and Quality Manager will oversee that QAPP requirements are met by the field staff. The SUXOS will notify the PM of any needed field CAs. The PM will have 24 hours to respond to the request for field CA.

Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Telephone Number and/or Email	Procedure
Health and Safety	UXOQCS/ UXOSO - CH2M	TBD	TBD	<ul style="list-style-type: none"> Responsible for the adherence of team members to the site safety requirements described in the SSHP. Will report incidents, near misses and safe behavior observations to PM and project health and safety professional.
Technical communications for MEC QAPP implementation, geophysical data interpretation, RCA/CA documentation	Project Geophysicist - CH2M	Matthew Barner	(704) 543-3273 TMatthew.Barner@ch2m.com	<ul style="list-style-type: none"> Contact Project Geophysicist regarding questions/issues encountered in the field, input on data interpretation, as needed. Project Geophysicist will have 24 hours to respond to technical field questions as necessary. Responses will be communicated to the PM via email or phone. Develop RCA/CA documentation, as needed, in conjunction with UXOQCS and MR Safety and Quality Manager
MR-related CAs	MR Safety and Quality Manager - CH2M	George DeMetropolis	(619) 564-9627 Geroge.Demetropolis@ch2m.com	<ul style="list-style-type: none"> Any MR-related CAs for field and data collection issues will be developed by the SUXOS, UXOQCS/UXOSO and/or the MR Safety and Quality Manager and reported to the PM within 24 hours.
Technical communications for project implementation, and data interpretation	AQM - CH2M	John Tomik	(757) 671-6259 John.Tomik@ch2m.com	<ul style="list-style-type: none"> Contact AQM regarding program level quality issues, as needed. AQM will have 24 hours to respond to technical field questions as necessary. Responses will be communicated to the PM via email or phone.
Utility clearing, Vegetation reduction, PLS to reacquire DGM targets, and intrusive investigation of DGM targets	Utility clearing (Accumark), vegetation reduction (Clearfield), PLS (Bowman), and MEC (USAE) subcontractors	Aaron Blow Chuck Harrell Tristan Stewart Doug Ralston	(703) 489-5657 (757) 620-7057 (410) 490-8641 (813) 500-1099	<ul style="list-style-type: none"> Contact subcontractor PM regarding questions or issues on utility clearing, vegetation reduction, reacquisition of anomalies, and intrusive investigation Subcontractor PM will have 24 hours to respond to questions. Subcontractor contacts SUXOS, UXOSO, or UXOQCS regarding questions or issues in the field that require immediate response.

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Worksheet #7—Personnel Responsibilities and Qualifications Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Joseph Rail	RPM	NAVFAC Washington	Provides project oversight and direction, provides technical review of deliverables, and serves as primary regulatory interface for the Navy and the project team.
Travis Wray	IR Program PM	NSFIH	Provides project oversight and direction, assist with coordination of project activities between CH2M and installation operations personnel, and provides technical review of deliverables.
Mike Green	MRP Quality Assurance Officer	NAVFAC	Provides quality review of MRP-related projects and activities for NAVFAC, including review of MEC QAPP documents.
Robert Thomson	RPM	EPA Region III	Reviews and provides input for EPA on development of the UXO 20 MEC QAPP.
Curtis DeTore	RPM	MDE	Reviews and provides input for MDE on the UXO 20 MEC QAPP.
Margaret Kasim	AM and PM	CH2M	Oversees overall project status for all projects implemented at NSFIH. For PM role, manages project, oversees all project activities, and is responsible for all aspects of the work performed under this MEC QAPP.
John Tomik	AQM	CH2M	Provides program-level review of MEC QAPP. Provides oversight and approval for all technical issues related to the project.
George DeMetropolis	MR Safety and Quality Manager	CH2M	Provides approval for all MR-related issues for the project. Implements CH2M's standard munitions QC procedures and conducts audits to confirm that QC protocols are being followed.
Kevin Lombardo	MR Senior Technical Consultant (STC)	CH2M	Technical lead for MR program conformance to approved processes and procedures. Provides oversight and review of MR-related activities.
Matthew Barner	Project Geophysicist	CH2M	Provides technical review of as-staked data gathered by the Land Surveyor subcontractor and intrusive investigation findings relative to DGM target location, amplitude and characteristics. Develops RCA/CA documentation, as needed, in conjunction with the UXOQCS/SUXOS and Senior Geophysicist.
Tamir Klaff	Senior Geophysicist	CH2M	Performs independent technical review of RCA/CA documentation prepared by the Project Geophysicist; performs technical review as part of senior review team for project and client deliverables.

Worksheet #7—Personnel Responsibilities and Qualifications Table (continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Carl Woods	HSM	CH2M	Develops and approves project SSHP and reviews subcontractor safety records and submittals.
Nelson Figeac	SUXOS	CH2M	Provides technical oversight and support for MEC QAPP revisions and fieldwork implementation. Supervises and coordinates all field activities. Implements approved MEC QAPP. Plans, coordinates, and supervises all explosives operations. Coordinates all aspects of QC and health and safety with the UXOQCS/UXOSO.
TBD	UXOQCS/UXOSO	CH2M	Implements the MEC-related QC provisions of the project. Implements the SSHP, including MEC-related and general safety components.
Chuck Harrell	Field Team Leader (FTL)	Vegetation Reduction Subcontractor	Implements approved MEC QAPP for vegetation reduction.
Doug Ralston	FTL	MEC Subcontractor	Implements approved MEC QAPP for geophysical anomaly avoidance and intrusive investigation of targets.
Tristan Stewart	FTL	PLS Subcontractor	Implements approved MEC QAPP for DGM target flagging in advance of intrusive investigation.

Worksheet #8—Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates
Remedial Investigation	Hazardous waste operations and emergency response 40-hour training or 8-hour annual refresher, as appropriate	Registered training organization	Agency- and contractor-specific	FTL and site safety coordinator (SSC); Navy and regulatory agency representatives	FTL and SSC from CH2M; UXO personnel; onsite visitors from Navy and regulatory agencies	Contractor, Navy, or regulatory agency human resources department
Fieldwork	MEC Awareness Training [†]	CH2M UXO Technician	Before mobilization	All non-UXO technicians who will work at the site	FTL and SSC from CH2M Field team members from subcontractors	Project folder

Note:

[†] MEC training is often referred to as Recognize, Retreat, Report (RRR or 3-R) training. This training is intended to make the trainees aware of the potential presence of MEC, ways to recognize potential MEC, and what to do if potential MEC is observed. This training DOES NOT enable the trainee to identify the type of MEC or handle the potential MEC item.

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Worksheet #9—Project Scoping Session Participants Sheet

Project Name: RI for UXO 20 - Safety Thermal Treatment Point Projected Date(s) of Sampling: Summer 2016 PM: Margaret Kasim – CH2M				Site Name: UXO 20 – Safety Thermal Treatment Point Site Location: NSFIIH, Indian Head, Maryland	
Date of Session: September 21, 2015 Scoping Session Purpose: Obtain Tier I Partnering Team consensus on intrusive investigation approach of DGM anomalies					
Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Joseph Rail	RPM	NAVFAC Washington	(202) 685-3105	joseph.rail@navy.mil	Navy RPM
Travis Wray	RPM	NSFIIH	(301) 744-2262	travis.wray@navy.mil	NSFIIH RPM
Robert Thomson	RPM	EPA Region III	(215) 814-3337	Thomson.bob@epa.gov	Regulator
Curtis DeTore	RPM	MDE	(410) 537-3791	Curtis.detore@maryland.gov	Regulator
Nathan Doyle	Hydrogeologist	EPA Region III		Doyle.nathan@epa.gov	Technical support
Margaret Kasim	AM/PM	CH2M	(703) 376-5154	margaret.kasim@ch2m.com	AM/PM
Victoria Waranoski	Staff Engineer	CH2M	(703) 376-5049	victoria.waranoski@ch2m.com	Lead writer
George DeMetropolis	MR Safety and Quality Manager	CH2M	(619) 564-9627	George.demetropolis@ch2m.com	MR Technical support

Comments/Decisions

The objective of the scoping session held via conference call on September 21, 2015, was to obtain Team consensus on the approach of the intrusive investigation to characterize the sources of DGM anomalies.

The Team reviewed the DGM survey results. The DGM was conducted on May 1, 2014, across 0.53 acre of the site. Visual Sample Plan (Pacific Northwest National Laboratory, 2015) was used to evaluate the lateral extent of the DGM targets and assess whether elevated anomaly density areas (EADAs) or “clusters” of significance were evident. The Estimating a Proportion Method was used to determine the number of targets to be intrusively investigated to achieve the statistical sampling goal of 95 percent confidence to within ± 5 percent margin of error for the target population.

A total of 507 geophysical targets were identified during the 2014 DGM survey, and 479 were identified as potentially representing MEC/ material potentially presenting an explosive hazard (MPPEH) in the subsurface. The statistical tools indicated the targets identified during the 2014 DGM survey represented a single target population. The analysis indicated that a minimum of 213 targets are needed to be intrusively investigated to statistically characterize the proportion of munitions-related items to non-munitions-related

Worksheet #9—Project Scoping Session Participants Sheet (continued)

items. With the addition of two QC seeds, the total dig count would be 215 targets. The results of the statistical evaluation were documented in a technical memorandum entitled *Final Statistical Evaluation of Anomaly Selection for Intrusive Investigation at UXO 20* (CH2M, 2014).

Because depth to groundwater at the site is shallow (6 inches below ground surface [bgs] close to Mattawoman Creek and 3 feet bgs upgradient), the Team agreed to stop excavating once groundwater is encountered. The maximum depth of excavation will be 4 feet bgs, to conform to Occupational Safety and Health Administration (OSHA) and safety requirements, if water is not encountered; however, this depth may not be achieved because the depth to groundwater at the site is shallower than 4 feet bgs. Once groundwater is encountered, intrusive activities at the current dig location will stop as the UXO personnel will be unable to search the hole. The hole will then be backfilled with the excavated soil, and the anomaly location will be replaced with another DGM anomaly on the derived target list.

Because a statistical approach is planned for this investigation, it is necessary to intrusively investigate a minimum of 213 anomalies, excluding the QC seeds. However, the Team recognized that it may not be possible depending on the depth to groundwater at the site. The Team discussed the time of year for this work; possibly in summer when the groundwater table may be deeper due to less rainfall. If it is not possible to dig 213 targets, the achieved statistical confidence levels (as revised from the sampling goals), and any caveats to the results related to not investigating items below the water table, if applicable, will be presented in the RI report.

The Team was then informed of the status of Amendment 01 to the Explosives Safety Submission (ESS). The intrusive investigation work has been added to the original UXO 20 ESS; work consists of reacquiring anomalies, manually excavating to identify and remove each anomaly source, and handling of MEC and/or MPPEH if encountered. The draft version has been submitted by the Navy to Naval Ordnance Safety and Security Activity (NOSSA) for review.

Action Items

No action items were created during the scoping session.

Consensus Decision

IHIRT approved the proposed intrusive investigation approach.

Worksheet #10—Problem Definition Overview

Base Location

NSFIH is a naval facility in northwestern Charles County, Maryland, approximately 25 miles southwest of Washington, DC. The facility consists of two tracts of land: the Main Installation on the Cornwallis Neck Peninsula and the Stump Neck Annex located across Mattawoman Creek (Figure 1). The Main Installation contains approximately 2,500 acres and is bounded by the Potomac River to the northwest, west, and south; Mattawoman Creek to the south and east; and the town of Indian Head to the northeast. The Stump Neck Annex contains approximately 1,084 acres and is bounded by Mattawoman Creek to the northeast, the Potomac River to the northwest, and Chicamuxen Creek to the south-southwest.

Description and History

In the Preliminary Assessment (PA) report (Malcolm Pirnie, 2005), UXO 20 was referred to as a 1.6-acre site at the end of Old Burn Point Way on a peninsula that extends southwest from the Main Installation into the confluence of Mattawoman Creek and the Potomac River (Figure 2). According to the Initial Assessment Study (Fred C. Hart Associates, 1983), the peninsula is manmade, constructed of sand, fill material, rocket motor casings, empty cartridges, and coal fly ash. Based on a conversation between CH2M and NSFIH personnel on August 2, 2011, the northern part of the peninsula (within the footprint of the secondary burn area) is active and is being used by NSFIH to test hand grenades. Based on this information, the boundary of UXO 20 has been adjusted to include the southern part and spits (recent [since the PA] sediment deposition areas) of the peninsula, totaling approximately 0.97 acre. Within the remainder of this UFP-QAPP, the following terms apply: (1) UXO 20 (or site) refers to the area in the southern part of the peninsula encompassed by the new site boundary; and (2) “peninsula” refers to both the northern and southern parts of the peninsula; the old site boundary in the PA.

The history of MEC use on the peninsula, including UXO 20, is documented in the PA. The PA reports that the peninsula was built between approximately 1940 and 1942 and was set up for two separate uses: (1) a primary burn area, located from the tip of the peninsula to approximately 150 feet inland, which was used for open burning (OB) of munitions (cartridge-actuated devices [CADs] and propellant-actuated devices [PADs]); and (2) a secondary burn area, which covered the remainder of the peninsula and was used for munitions testing, including deflagration-to-detonation testing and pierce testing.

From 1942 to 1988, OB on the ground surface or in an open top, steel thermal treatment vessel occurred weekly in the primary burn area. Until the 1950s, propellants including CAD and PAD items were burned at a rate of 40 to 50 pounds per week. Water or solvent wet wastes with oil were burned in 55-gallon drums. In 1954, burning of propellants moved to Strauss Avenue Thermal Treatment Point. The burning of up to 25,000 pounds per year of less-sensitive explosives, other pyrotechnics (for example, squibs, igniters, caps, black powder) and difficult-to-burn ordnance materials continued through 1988. The peninsula was reportedly used for OB/open detonation (OD) and testing of projectiles, bulk propellant, demolition charges, CADs and PADs primers, less-sensitive explosives, high explosives, and other pyrotechnics using in-ground pits. (Note: specific descriptions and nomenclatures remain unknown.)

The PA also notes that initially material was burned directly on the ground, and new soil would be brought in as needed. In 1980, burn pans were used, but the steel deflection shield could not completely prevent ejected materials from leaving the area. These incidences were caused mostly by burning nitroglycerin solvents or plastic-bonded explosives in bulk form.

According to written documentation from the Navy, approximately 96 drums of ash/residue and solvent contaminated surface soil were removed from the site in 1988 (Navy, 1988). Based on visual observation, it was estimated that the soil excavation spanned a 40-foot-diameter area to a depth of 1 foot. The subsurface

Worksheet #10—Problem Definition Overview (continued)

soil was not disturbed. The location of soil removal, backfill efforts, and quantification of contaminant concentrations are unknown.

As part of the PA, a site visit was conducted on June 23, 2003. The PA report noted that evidence of explosives or MEC was not observed (Malcolm Pirnie, 2005). However, a large cylindrical unit (former burn tank), a free-standing metal frame, a steel deflection shield, and miscellaneous explosives testing equipment were observed. The former burn tank and steel deflection shield were located in the primary burn area. The former burn tank, which was approximately 8 feet high and 10 feet in diameter, was used to minimize ash and debris emissions during burning. The steel deflection shield was approximately 15 feet high and 15 feet wide and was believed to have been used to block flying debris from the burn tank from reaching the Potomac River and Mattawoman Creek.

In 2008, 2009, and 2010, the Navy and CH2M conducted several site visits, and observed the same items observed during the PA visual survey. In the northern part of the peninsula, a 40-millimeter (mm) cannon was observed; there is no evidence of this cannon being fired at UXO 20, and no documentation explaining when or why this cannon was moved to the peninsula. In August 2011, the Navy informed CH2M that hand grenades are still being tested in the northern part of the peninsula approximately 1 week every 2 months. The type of grenade being tested is the Grenade, Hand: Non-Lethal (Stun), M84, commonly referred to as the “flash bang” grenade.

In 2010, a Site Investigation (SI) was completed for MEC, but consisted only of an aerial photographic analysis (CH2M, 2010). Removal and staging of surface metal items to perform a DGM was not approved by NOSSA to be done under an Explosives Safety Determination Request, so the DGM was not performed as a part of the SI. The aerial photographic analysis consisted of a review of historical aerial photographs from 1943 to 1981. The analysis provided documentation of the expansion of the peninsula and evidence of the OB/OD activities at the southern end of the peninsula. The photos indicated visibly stained areas and dark-toned material at the southern end of the peninsula within the new site boundary. The SI recommended an RI for MEC.

In 2014 and IAW the *Final Remedial Investigation Work Plan for UXO 20 - Safety Thermal Treatment Point* (CH2M, 2012) and NOSSA- and Department of Defense Explosives Safety Board (DDESB)-approved ESS (CH2M, 2013), the following work was completed on the site as part of the RI: vegetation clearance, surface removal of metal debris that were 2 inches by 2 inches or larger, removal of large items on the surface (former burn tank, deflection shield, and concrete block), utility clearance, DGM, and collection of environmental samples (surface soil, subsurface soil, sediment, and *in situ* groundwater). No MEC/MPPEH items were encountered during the surface removal activity. The results from these field activities will be documented in an RI report after completion of the DGM anomaly intrusive investigation documented in this MEC QAPP.

Geology, Hydrogeology, and Hydrology

The peninsula is man-made and constructed of sand, fill material, rocket motor casings, empty cartridges, and coal fly ash. Because the peninsula is man-made and extends into the Mattawoman Creek-Potomac River confluence, the surficial water table is expected to be directly connected to these surface water bodies. The groundwater table at the site ranges from 0.5 foot to 3 feet bgs.

The peninsula is flat, with an elevation of 5 feet above mean sea level, sloping towards Mattawoman Creek and the Potomac River. A wetland covering approximately 1.25 acres lies northeast of the peninsula, but is not within the site boundary. Surface water runoff flows toward the Potomac River and Mattawoman Creek. The peninsula is located within a 100-year floodplain and is tidally influenced.

Worksheet #10—Problem Definition Overview (continued)

Conceptual Site Model

The conceptual site model (CSM) for UXO 20 was presented in Section 5.4.11 of the PA, and was summarized in the SI. Historical evidence indicates that MEC/MPPEH may be present on the surface and in the subsurface from construction of the man-made peninsula and OB/OD activities. Based on the results of the surface clearance in support of the DGM in 2014, no MEC/MPPEH items were identified at the site. However, the CSM for MEC/MPPEH, shown as Figure 3, illustrates several potential exposure pathways for receptors that could be exposed to MEC/MPPEH if present at the site.

Human receptors (Navy personnel [military and civilian], trespassers, visitors, maintenance workers, contractors, and recreational river users) may contact MEC/MPPEH items at the surface during working and walking. Contractors and Navy personnel have the potential to encounter MEC/MPPEH in the subsurface during intrusive activities. Ecological receptors (biota) may come in contact with MEC/MPPEH as a result of surface soil disturbance during foraging, nesting, or other natural activities.

Step 1. Problem Statement

The objective of this intrusive investigation is to characterize, above the groundwater table, the nature and vertical extent of the DGM anomaly sources for 213 targets selected for intrusive investigation. MEC/MPPEH may be present in the surface or subsurface or both because of historical site activities, where these items would pose an unacceptable explosive risk to authorized current and future Navy personnel (military and civilian), maintenance workers, and contractors; visitors, and current and future trespassers; and recreational river users.

Step 2. Identify Decisions to be made

1. What are the DGM anomaly sources?

Recovered items will be segregated as MEC/MPPEH, material documented as safe (MDAS), or scrap metal IAW the ESS. The UXOQCS will verify classifications.

2. What is the depth of DGM anomaly sources?

Depth to recovered items will be logged and reported for each location. If conditions prevent identification of the anomaly source (below water or below 4 feet [1.2 meters] bgs), the condition will be recorded and no depth determination will be possible at that location.

3. Is further investigation or action warranted at UXO 20?

Once anomaly sources have been identified, the need to investigate the additional targets will be assessed and remedial alternatives will be reviewed for a Feasibility Study.

Step 3. Identify Information Inputs

Information inputs include the statistical evaluation of the DGM targets and the selection of the targets to be excavated, which will make up the final dig list. Additional information inputs include the as-flagged locations of the DGM targets by the PLS subcontractor and the observed findings at each dig location.

Step 4. Define the Boundaries of the Study

The study area boundary is the footprint of the DGM survey area (Figure 2).

Worksheet #10—Problem Definition Overview (continued)

Step 5. Develop Analytical Approach:

The PLS subcontractor will reacquire and mark with a vinyl-stem flag the location of the targets on the dig list. Flags will be placed in the ground with a 1-foot safety factor applied north of the DGM target position.

Excavation of the selected anomalies will be performed using hand tools by UXO technicians. Recovered MEC and MPPEH items will be removed and disposed IAW the ESS. The flowchart presenting the process of removing and disposing of MEC and MPPEH is presented on Figure 4.

Step 6: Specify Performance or Acceptance Criteria:

The performance and acceptance criteria are presented in **Worksheet #12**.

Step 7: Develop the Plan for Obtaining Data

Worksheet #14 contains a summary of the definable features of work (DFOWs). **Worksheet #17** contains the detailed approach, methods, operational procedures, and QC requirements associated with the visual inspection.

Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements

Who will use the data?

IHIRT (Navy, EPA Region III, and MDE) will use the data to make decisions about the path forward for UXO 20. CH2M will use the data to prepare an RI report.

What are the project action limits (PALS)? (Specified detailed list should be provided in Worksheet #15)

Not applicable because environmental samples will not be collected.

What will the data be used for?

The data will be used to:

- Identify the sources of the DGM anomalies selected for investigation
- Assist in the characterization, above the groundwater table, of nature and extent of MEC/MPPEH at the site for the RI
- Perform an explosive safety hazard assessment for MEC/MPPEH using the MEC Hazard Assessment Guidance to determine if there are explosive hazards posed by any MEC/MPPEH present at the site
- Evaluate remedial and removal alternatives

What types of data are needed?

- Reports from previous investigations, including relevant DGM reports
- EM61-MK2 target selection threshold from the 2014 detection survey
- Final target list
- As-flagged anomaly positions from the land surveying subcontractor
- Findings of the intrusive investigation of the selected targets, as reported by UXO personnel
- Validation that geophysical instruments used onsite (analog instruments, EM61-MK2) are functioning properly
- Field notes and QC documentation in the form of daily QC reports and digital entries and photographs in CH2M's Munitions Response Site Information Management System (MRSIMS)

How “good” do the data need to be to support the environmental decision?

Recorded data and information must be compliant with the performance criteria specified in Worksheet #12-1b and #12-2 and Worksheets #34, 35, and 36. In instances where these criteria are not met, data usability must be evaluated through the RCA/CA process.

How much data are needed?

For locations that can be dug, specific information on the nature of the anomaly source must be recorded. This information is presented in greater detail in Worksheet #17. It includes, but may not be limited to, quantity, composition, depth, general condition, distance from flag, and source categorization (for example, MEC, MPPEH, munitions scrap). Photos are also needed. MRSIMS entries, daily QC forms, and hard copy logs are also needed for this investigation.

Where, when, and how should the data be collected/generated?

- The data will be collected at the locations of the 215 targets provided in the dig list.
- The schedule is identified on Worksheet #16. The field event is planned to occur in 2016.
- Data will be collected IAW the procedures outlined in this MEC QAPP.

Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

Who will collect and generate the data?

- The PLS subcontractor will physically mark the target locations provided in the final dig list, with a 1-foot safety factor applied to the Northing position.
- CH2M's MEC subcontractor personnel will reacquire the location of all DGM anomalies using geophysical instruments, perform the intrusive investigation of the anomalies on the dig list, and record required field information using MRSIMS (see **Worksheet #14**) and hard copy log books as needed.

How will the data be archived?

All files will be made available for QC during the project to verify that the field procedures are implemented IAW the ESS and this MEC QAPP. All data and field notes will be maintained for the duration of the project. Electronic data will be stored on a secure CH2M server and will be uploaded into the Naval Facilities Engineering Command (NAVFAC) munitions database and subsequently uploaded into the Navy Installation Restoration Information System (NIRIS).

The data will be archived IAW Navy guidance. At the end of the project, archived data will be returned to the Navy.

PQOs listed in the form of if/then qualitative and quantitative statements.

The data to be collected during this initial investigation of the site does not allow for a quantitative risk-based decision. Therefore, specific "quantitative" PQOs are not currently developed. Data from this investigation may be used during future project activities to further develop PQOs for any additional investigations or activities. General "qualitative" PQOs are provided below, in the form of if/then statements, to summarize the objective of this investigation.

- If a 3.3-foot (1-meter) radius around the DGM anomaly location (considering the 1-foot safety factor applied to flag positions) is searched and the geophysical anomaly cannot be reacquired, then the identified target will be classified as a 'no-contact'.
- If a target location is reacquired and an anomalous response is detected from a source greater than 4 feet deep, then the location will be categorized as "below depth" and "left in place" in field logs and annotated as such in the MRSIMS entries; no determination on nature of the anomaly source will be made.
- If a target location is reacquired and an anomalous response is detected from a source below water table, then the location will be categorized as "below water" and "left in place" in field logs and annotated as such in the MRSIMS entries; no determination on nature of the anomaly source will be made.
- If MEC/MPPEH is found and the qualitative MEC hazard evaluation concludes that an unacceptable explosive hazard is present at the site, then further action may be required and remedial alternatives may be developed in a feasibility study.

Worksheet #12-1—Measurement Performance Criteria Table

Measurement Quality Objective	Data Quality Indicator	Measurement Performance Criteria	Evaluation Method	Action if Failure Occurs and Documentation Method
EM61-MK2 Battery Levels	Sensitivity	Battery level must be ≥ 12.0 volts.	Sensor battery levels will be checked each time the instrument is scheduled for use.	Replace battery if voltage drops below 12.0 volts. UXOQCS daily QC reports.
EM61-MK2 Static Response (operated in real-time display mode)	Accuracy	Assessment will be qualitative in nature where the optimal performance demonstrates responses within ± 20 percent of predicted responses from the industry standard objects (ISOs) at known depth and orientation (Naval Research Laboratory, 2009).	When scheduled for use and after nulling, the EM61-MK2 will be tested by observing real-time responses on target selection channel to known objects buried in the Instrument Verification Strip (IVS) (small ISOs) with the instrument kept stationary and centered over the ISO locations.	If responses are outside ± 20 percent threshold, UXOQCS will discuss with the Project Geophysicist to determine whether the instrument is operating properly. If sensor is suspected of not working properly, it will be repaired or replaced prior to use during intrusive investigation. UXOQCS daily QC reports and, if deemed necessary by the Senior Geophysicist and UXOQCS, the RCA/CA process will be followed.
DGM Target Reacquisition System Accuracy	Accuracy	Position error of survey equipment is ≤ 4 inches of ground truth positions.	Survey instruments used for DGM target reacquisition are operational by checking as-staked positions at ground truth locations (e.g., temporary control points or survey benchmarks).	Repair or replace malfunctioning equipment prior to use if problem is identified immediately in the field; otherwise RCA/CA process. UXOQCS daily QC reports.

Worksheet #12-1—Measurement Performance Criteria Table (continued)

Measurement Quality Objective	Data Quality Indicator	Measurement Performance Criteria	Evaluation Method	Action if Failure Occurs and Documentation Method
Target Position Accuracy During Reacquisition	Accuracy	Positions of as-flagged locations are within 6 inches of supplied target location from dig list.	As flagged target locations will be recorded by PLS subcontractor (or others performing reacquisition) IAW SOP MR-AC-08-01.	RCA/CA process. UXOQCS daily reports.
Intrusive Operations Anomaly Source Resolution Data	Accuracy	Type, condition, and fuzing state (no fuze, unarmed fuze, armed fuze) of munitions-related items correctly identified.	At each occurrence, UXOQCS identification of munitions-related anomaly sources.	RCA/CA process. UXOQCS QC daily reports, MRSIMS entries, and hard copy log book entries.
	Accuracy	100 percent of all blind seeds are removed and their location identified to within 3.3 feet.	At each QC seed item location, UXOQCS review of identification of blind seed item location.	RCA/CA process. UXOQCS QC daily reports, MRSIMS entries, and hard copy log book entries.
	Completeness	At least 10 percent of investigated targets ≤ 4 feet are investigated by UXOQCS to verify removal of source of anomaly. Anomalies ≥ 4 feet will not be resolved.	Daily and weekly UXOQCS audit of anomaly ID data; QC of excavation following to ensure removal of targets to specific depth.	RCA/CA process. UXOQCS QC daily reports.
	Completeness	MRSIMS forms and hard copy field notes are complete and correctly filled out for each target	Daily UXOQCS audit of anomaly ID forms (Daily Grid Tracking Logs – electronic).	MRSIMS forms and field notes will be updated or edited to include deficient information. If this cannot be done, then RCA/CA process will be undertaken to assess data usability. UXOQCS daily QC reports.
	Completeness	100 percent of MEC items logged are verified as blown-in-place or otherwise disposed of IAW the ESS.	Weekly UXOQCS audit of MEC accountability.	RCA/CA process. UXOQCS QC daily reports.

Worksheet #12-2—Definable Features of Work Auditing Procedure

Definable Feature of Work	Task with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Pre-mobilization Activities	Document Management and Control	Verify appropriate measures are in place to manage and control project documents.	Preparatory Phase (PP)	Once	Appropriate measures are in place to manage and control project documents.	Do not proceed with field activities until criterion is passed.
	Data Management	Verify appropriate measures are in place to manage and control project data. MRSIMS database and tablet PCs have been setup for intrusive investigation.	PP	Once	Appropriate measures are in place to manage and control project data. MRSIMS database is set up and forms have been deployed to tablet PCs with target list included.	Do not proceed with field activities until criterion is passed.
	Subcontractor Procurement	Ensure procurement of subcontractors and verify qualifications, training, licenses.	PP/Initial Phase (IP)	Once	Subcontractors' qualifications, training, and licenses are up to date and acceptable.	Ensure subcontractor provides qualifications, training, and licenses or change subcontractor.
	MEC QAPP	Verify the MEC QAPP has been developed and approved.	PP/IP	Once	MEC QAPP has been prepared and approved, all parties agree to the technical and operational approach.	Do not proceed with field activities until criterion is passed.
Mobilization/ Site Preparation	Onsite Document Review	Verify project plans and scope of work are approved and review with project team and get appropriate signatures	PP/IP	Once	Document is approved and has been reviewed and acknowledged by appropriate project team members.	Personnel who are not familiar with the project plans may not proceed with field activities until criterion are passed.
	Establish Communication and Logistics	Verify functionality of communications equipment and logistical support is coordinated	PP/IP	Once	Communications and other logistical support are coordinated.	Do not proceed with field activities until criterion is passed.

Worksheet 12-2—Definable Features of Work Auditing Procedure (continued)

Definable Feature of Work	Task with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Mobilization/ Site Preparation	Local Agencies and Emergency Services Notification	Verify local agencies and emergency services have been notified of site activities if required by contract.	PP/IP	Once	Emergency services and local agencies are aware of site activities.	Do not proceed with field activities until criterion is passed.
	Verify site specific training	Verify all site-specific training has been performed and acknowledged.	PP/IP	Once	Site specific training is performed and acknowledged.	Do not proceed with field activities until criterion is passed.
Utility Clearance	Work Method	Verify Independent 3rd party utility clearance was conducted in conjunction with Miss Utility of Maryland and NSFIH Dig Permit	PP/IP	Once	Independent 3rd party utility clearance, Miss Utility of Maryland, or NSFIH Dig Permit was not conducted.	Stop activity until full compliance can be assured.
Vegetation Reduction	Vegetation Reduction	Verify operations are conducted IAW MEC QAPP, relevant SOPs, and SSHP/ Accident Prevention Plan (APP).	PP/IP/ Follow-up Phase (FP)	Daily	Vegetation is cut to a height of 6 inches above ground surface and brush/trees with a diameter of less than 3 inches. Work is being performed IAW this MEC QAPP, applicable SOPs and SSHP/APP.	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary.
	Geophysical Anomaly Avoidance	Verify operations are conducted IAW MEC QAPP, MRP SOP-0001, and SSHP/APP.	IP/FP	As Required	Documentation that UXO personnel performed geophysical anomaly avoidance during intrusive operations by non-UXO personnel	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary.

Worksheet 12-2—Definable Features of Work Auditing Procedure (continued)

Definable Feature of Work	Task with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
DGM Target Reacquisition	Work Methods	Verify operations are conducted IAW MEC QAPP, MR SOP-SS-08-01 and relevant subcontractor SOPs, and SSHP/APP.	IP/FP	Daily	Work methods are established and communicated and being performed IAW this MEC QAPP, applicable SOPs and SSHP/APP.	Stop activities until the MEC QAPP and SOPs can be followed and any activities not performed within compliance are re-evaluated and re-performed, if necessary.
Subsurface removal	Intrusive investigation of DGM targets	Verify operations are conducted IAW ESS, MEC QAPP, relevant subcontractor SOPs, and the SSHP/APP: - Explosives Accountability - Disposal/Demolition Operations - Scrap Inspection Operations	IP/FP	Daily	Work performed IAW MEC QAPP, ESS, relevant subcontractor SOPs, and the SSHP/APP.	Stop activity until full compliance can be confirmed and any activities not performed within compliance are re-evaluated and re-performed if necessary.
		DGM anomaly source has been removed; final amplitude response (in milliVolts) on target selection channel recorded in digital and hard copy logs.	FP	Daily	Peak response is less than target selection threshold used during DGM survey. Exceptions include instances where UXOQCS and onsite UXO personnel determine that original anomaly source has been identified and removed but where peak EM61-MK2 response may still be elevated above the threshold level due to presence of trash pit, nails, rust flakes or other conditions that may not warrant further excavation at the discretion of the UXOQCS.	Unless otherwise noted by UXOQCS, stop activity until full compliance can be confirmed and any activities not performed within compliance are re-evaluated and re-performed if necessary.

Worksheet 12-2—Definable Features of Work Auditing Procedure (continued)

Definable Feature of Work	Task with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	Anomaly Removal Verification	UXOQCS will verify 10% of anomalies have been cleared.	FP	Daily	Peak response is less than target selection threshold used during DGM survey. Exceptions include instances where UXOQCS and onsite UXO personnel determine that original anomaly source has been identified and removed but where peak EM61-MK2 response may still be elevated above the threshold level due to presence of trash pit, nails, rust flakes or other conditions that may not warrant further excavation at the discretion of the UXOQCS.	<u>Unless otherwise noted by UXOQCS</u> , stop activity until full compliance can be confirmed and any activities not performed within compliance are re-evaluated and re-performed if necessary.
		Verify that the anomaly source recovered during intrusive excavations is appropriate to the amplitude of the initial anomaly detected during the DGM.	IP/FP	Daily	Recovered anomaly source is appropriate to the amplitude of the initial anomaly detected during the DGM.	Return to the location of the anomaly excavation to determine if additional anomaly sources are present. If anomaly sources being recovered continue to be inappropriate for the amplitude as detected during the DGM, an RCA must be performed and the project team must meet to discuss and determine appropriate action.

Worksheet 12-2—Definable Features of Work Auditing Procedure (continued)

Definable Feature of Work	Task with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
	Data Management	Verify that all specifications of the discovered items (anomaly ID, nomenclature or description, depth, weight, quantity, orientation and azimuth [directional MEC only], filler, and disposition) have been documented within MRSIMS and in required hard copy backup logs.	IP/FP	Daily	Documentation of recovered investigations findings are accurate.	Receive proper or complete recovered investigation findings from investigation team leader and refresh documentation requirements to responsible parties.
Recovery of Blind Seeds Items	Work method	UXOQCS inspects intrusive investigation results.	FP	Each occurrence	Recovery and documentation of blind seed items	Root cause analysis on why blind seed was not recovered/documented. Possible rework of DGM target.
MPPEH Processing	Final inspection of MEC/MPPEH	UXOQCS conducts final inspection of MEC/MPPEH.	FP	Each occurrence	All crevices and aspects of site can be visually inspected to verify free of explosive material.	MEC/MPPEH item is re-processed by detonation or any other demilitarization method outlined within the ESS.
	MDAS Packaging and Labeling	1 st and 2 nd daily Inspection of MDAS packaging and labeling ([1] signed Department of Defense Form 1348-1a within container, [1] on side of container, and copies sent to PM and disposal facility). Witness destruction of recyclable MDAS.	FP	Each occurrence	Labeling and packing of MDAS conforms to <i>Ammunition and Explosives Safety Ashore</i> (Naval Sea Systems Command Ordnance, 2011. Publication 5, Volume 1, 7 th Rev. Change 10).	MDAS will not be shipped until it conforms to OP5.

Worksheet 12-2—Definable Features of Work Auditing Procedure (continued)

Definable Feature of Work	Task with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
MEC Detonation	Demilitarization of MEC/MPPEH using donor explosives	100% oversight during explosive operations setup, execution, and post-investigation	IF/FP	Each occurrence	Conforms to Contractor's SOPs.	Explosive main charge fails to detonate, or fragments are thrown beyond explosive safety quantity distance (ESQD) arcs.
Demobilization	Demobilize from the site	Verify equipment and personnel have been demobilized from the site and the site is returned to pre-mobilization condition.	FP	Once	All personnel and equipment have been demobilized and the site is in pre-construction condition.	Restore site to preconstruction condition, package and ship all equipment offsite, demobilize crew.

Worksheet #13—Secondary Data Criteria and Limitations Table

Secondary Data	Data Source	Data Generator(s)	How Data Will Be Used	Limitations on Data Use
Final PA Report	<i>Final Preliminary Assessment – Main Installation, Naval District Washington, Indian Head, Maryland, 2005</i>	Malcolm Pirnie, 2005	Information from this report will be used for background and historical information.	Limited historical records were available/identified during the PA.
SI Report	<i>Final Site Inspection Report for UXOs 6, 9, 11, 13, 18, 19, 20, 27, 29, 30, 31, and 33, Naval Support Facility Indian Head, Indian Head, Maryland</i>	CH2M, 2010	Information from aerial photographs data will be used to supplement background information.	Limited to interpretation of aerial photos.
GSV Report (internal document)	<i>(Draft) Geophysical System Verification Report for UXO 20, Safety Thermal Treatment Point, Naval Support Facility Indian Head, Indian Head, Maryland</i>	CH2M, 2014	Information will be used to reacquire DGM targets.	None
Final Statistical Evaluation of Anomaly Selection for Intrusive Investigation	<i>Final Statistical Evaluation of Anomaly Selection for Intrusive Investigation at UXO 20, Naval Support Facility Indian Head, Indian Head, Maryland</i>	CH2M, 2014	Information will be used for target replacements.	None
ESS	<i>Final Explosives Safety Submission for UXO 20 Interim Removal Action and Intrusive Investigation of DGM Anomalies, Amendment 01, Naval Support Facility Indian Head, Indian Head, Maryland</i>	CH2M, 2015	The ESS will be used during the MR activities.	None

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Worksheet #14—Summary of Project Tasks

Activities to be performed at UXO 20 have been divided into definable features of work and the tasks to be completed are outlined in the table below. Procedures for these tasks, including QC checks, recording and correcting data, data processing, data management, and information management will be performed IAW the SOPs listed below and presented in Appendix A.

Definable Feature of Work	Tasks	SOP
Pre-mobilization Activities	<ul style="list-style-type: none"> • MEC QAPP development and approval • Geographic Information System (GIS) setup • MRSIMS database and tablet PC forms setup • Subcontractor procurement • Document management and control • Data management • Comprehensive work approval process (from NSFIIH) 	SOPs will be provided by subcontractors (anomaly reacquisition, and intrusive investigation) upon procurement
Mobilization/Site Preparation	<ul style="list-style-type: none"> • Mobilize Crew and Equipment • Mobilize geophysical sensors • Department of Defense Form 626 vehicle inspection and hazards of electromagnetic radiation to ordnance (HERO) certification • Onsite Document Review • Communications and Logistics Establishment • Local Agencies and Emergency Services Notification if required • Site Specific Training • Establish exclusion zones (EZs), entry control points, and rally points 	SOPs will be provided by MEC subcontractor upon procurement
Utility Clearing	<ul style="list-style-type: none"> • Flag and spray paint detected underground utilities 	--
Vegetation Reduction	<ul style="list-style-type: none"> • Vegetation Reduction • Equipment Maintenance • Equipment Testing and Setup • MEC/MPPEH avoidance during vegetation Reduction 	MRP-SOP-0001
DGM Target Reacquisition	<ul style="list-style-type: none"> • Equipment Setup and Testing • Recovery of site-specific control or establishment of new control by PLS • Anomaly Reacquisition (1-foot North of DGM Target Location) • Geophysical Anomaly Avoidance by UXO technician 	SOP MR-AC-08-01

Worksheet #14—Summary of Project Tasks (continued)

Definable Feature of Work	Tasks	SOP
Subsurface Removal	<ul style="list-style-type: none"> • Target reacquisition using handheld geophysical instruments (White's XLT and Schonstedt GA-52Cx) and EM61-MK2 within 3.3 foot (1 meter) radius of target location • Intrusive Investigation • Documentation and Data Reporting • Team Separation Distance & Composition • Management of recovered MEC/MPPEH • Management of scrap • Equipment Testing and Setup • Anomaly Source Removal Verification • Documentation of findings • QC inspection 	ESS MRP-SOP-0001 and SOPs to be provided by MEC subcontractor upon procurement.
MPPEH Processing	<ul style="list-style-type: none"> • MPPEH collection, consolidation, segregating, 100% inspection, 100% re-inspection, and storage • Disposal of MDAS 	ESS SOPs will be provided by MEC Subcontractor upon procurement Witness destruction of MDAS
MEC Detonation	<ul style="list-style-type: none"> • Demilitarization Operations • Just-in-time delivery of commercial explosives to destroy MEC and vent MPPEH 	ESS SOPs will be provided by MEC Subcontractor upon procurement
Site Restoration	<ul style="list-style-type: none"> • Repair damages to site property 	--
Demobilization	<ul style="list-style-type: none"> • Demobilize Crew and Equipment 	--
Final Report and Closeout	<ul style="list-style-type: none"> • After Action Report • RI Report • Data Archiving • Procurement Closeout • Project Closeout 	--

Pre-Mobilization Activities

Before mobilization to the site occurs, planning activities will be performed to enhance timely project execution. This MEC QAPP has been developed to provide detail for how the project will be performed and the performance metrics. Before mobilization to the site occurs, this plan will be reviewed and approved by CH2M, the Navy, and regulators. Additionally, coordination will take place to ensure project support databases (GIS, MRSIMS) are updated for project activities, document and data management procedures are in place, and all subcontractors have been procured. Subcontractor qualifications, certifications, and licenses will be reviewed before subcontractor selection.

Worksheet #14—Summary of Project Tasks (continued)

A pre-investigation meeting will be held in advance of the proposed mobilization date for field activities with the Navy that will also serve as the pre-construction and mutual understanding meeting. At the meeting, CH2M will present an overview of the intrusive investigation and discuss project scope, schedule, health and safety concerns, QC procedures, and any site logistical issues to develop a mutual understanding of project details.

Mobilization/Site Preparation

Mobilization

Mobilization consists of transporting personnel and equipment to the work site and establishing temporary facilities and site controls, consisting of portable sanitary facilities, decontamination area, and site refuge area. General mobilization activities are listed below:

- Identify/procure, package, ship, and inventory project equipment.
- Notify Facilities Engineering and Acquisition Department, hospital, and fire department (onsite and offsite), as appropriate, of the site activities and make sure they are appropriately equipped to respond to site emergencies.
- Finalize operating schedules.
- Organize support facilities.
- Establish a project command post in an area that is convenient to intrusive activities, but outside the EZs.
- Assemble and transport the work force.
- Establish onsite communications (for example, mobile phones, two-way radios) between team members; implement NSFII HERO requirements.
- Comply with NSFII Safety 626 Inspection and approval of vehicles.
- Conduct site-specific training on the MEC/MPPEH procedures and hazards, including “3R training” (recognize, retreat, report). Minimum training requirements are listed in **Worksheet #8**.
- Verify that onsite personnel review this MEC QAPP and all applicable SOPs and appendices.
- Verify that all forms and project documentation are in order and project team members understand their responsibilities with regard to completion of project reporting requirements.
- Inform base and security personnel of site activities and duration for access of construction vehicles.
- Notify fire department and provide map and location of work and storage of MPPEH and/or as required commercial explosives.

During mobilization, a kickoff and site safety meeting will be conducted. This meeting will include a review of the work plan and review and acknowledgment of the SSHP by all site personnel. Additionally, a morning safety meeting will be conducted each day to review the tasks to be performed that day and any potential hazards. Additional meetings will be conducted as needed, as new personnel, visitors, and/or subcontractors arrive at the site. The meeting will ensure notification of UXO 20 stakeholder, Naval Surface Warfare Center Indian Head Explosive Ordnance Disposal Technology Division.

Worksheet #14—Summary of Project Tasks (continued)

Site Preparation and EZs

Site preparation activities include establishing boundaries and EZs. EZs and entry control points (ECPs) will be required and enforced during MEC/MPPEH operations IAW the ESS (CH2M, 2016). While an EZ is in effect, access to these areas will be limited to essential personnel and authorized visitors. If non-essential personnel enter the EZ, work will cease. Signs and/or barriers will be located at ECPs to the EZ. Observations points will be established to monitor the Potomac River for potential waterway traffic transiting EZs. MEC/MPPEH operations will be suspended until waterway traffic has exited the ESQD. Spotters will also monitor the airspace and stop work if approaching aircraft are observed.

Geophysical Sensors

Handheld geophysical instruments to be used include the Schonstedt GA-52Cx magnetometer and White's XLT (or equivalent sensor) all-metals detector.

The Schonstedt GA-52Cx detects the magnetic field of ferromagnetic objects and responds to the difference in the magnetic field between two sensors spaced approximately 20 inches apart. The response is a change in the frequency of the signal emitted by the instrument speaker.

The White's XLT all-metals detector is capable of identifying both ferrous and non-ferrous metals. Audible tones and a digital display on the instrument indicate the presence of subsurface metal. Like the Schonstedt GA-52Cx, it may be used at the site to assist with a variety of non-DGM support activities, but it will be specifically used to assist with the burial and placement of the IVS and DGM seed items to assess whether competing anomalies from subsurface metal (ferrous and non-ferrous) are present within 3.3 feet (1 meter) of a proposed seed location.

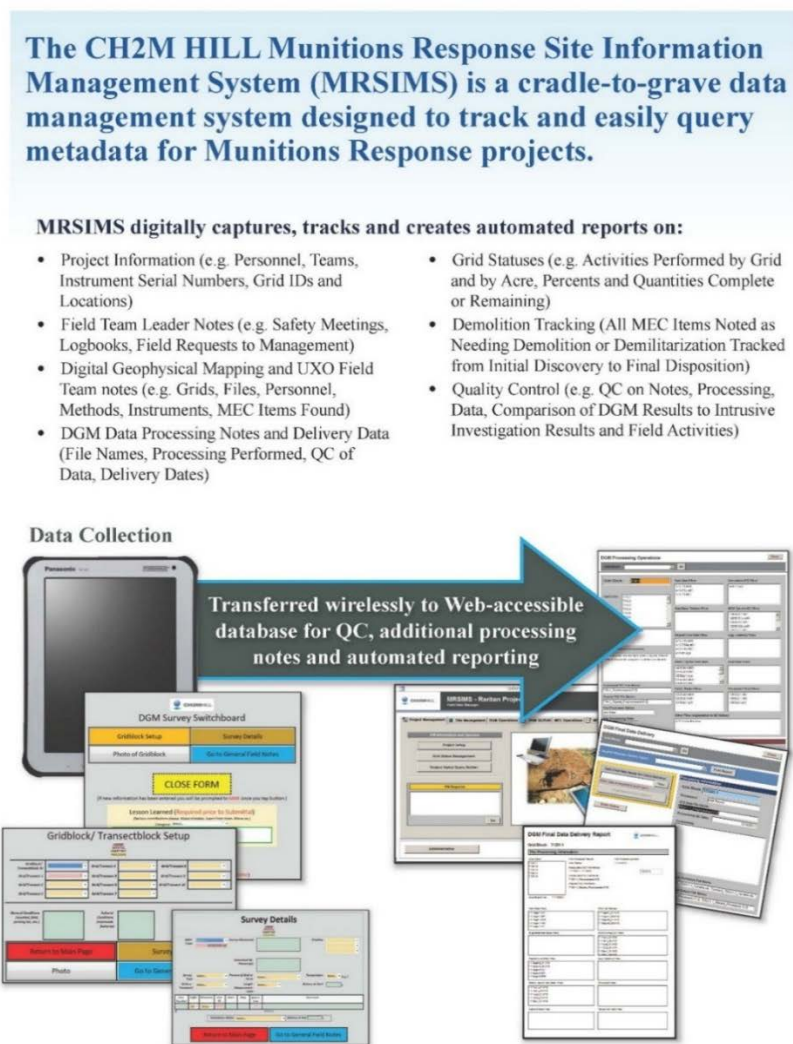
UXO personnel will use the Geonics EM61-MK2 during anomaly reacquisition and anomaly source removal verification. The EM61-MK2 is a high-resolution time-domain EM instrument designed to detect, with high spatial resolution, shallow ferrous and non-ferrous metallic objects. The use of the EM61-MK2 is well documented for munitions response actions and has been successfully used by CH2M for investigations at NSFIIH. The standard EM61-MK2 system consists of two air-cored coils, a digital data recorder, batteries, and processing electronics. The Tx coil generates a pulsed primary magnetic field, which induces eddy currents in nearby metallic objects. The Rx coils measure the response decay of these eddy currents at fixed moments in time.

Munitions Response Site Information Management System (MRSIMS)

CH2M will use MRSIMS for recording field notes, site conditions, taking photos, and recording intrusive investigation results during field operations. Information is entered into a forms-based operating system using tablet PCs in the field for use by data processing and QC personnel. Figure 5 presents a schematic of the MRSIMS data flow. The MRSIMS database and forms needed for the intrusive investigation are created in advance and edited, as necessary, throughout the investigation.

Worksheet #14—Summary of Project Tasks (continued)

Figure 5
MRSIMS Data Flow Schematic



MRSIMS forms data will be submitted daily, where the data entered into the forms on the tablets are transmitted via the Internet to a secure SharePoint site. Once visible on the SharePoint site, the data are imported into the project-specific MRSIMS database for review and use during subsequent project stages.

Geophysical Anomaly Avoidance

Geophysical anomaly avoidance techniques will be implemented by CH2M UXO technician IAW the ESS to minimize the chances of unexpectedly encountering MEC/MPPEH in the subsurface. This process will be performed during activities performed by non-UXO personnel that may require intrusive operations (for example, placing flags at DGM target locations).

Worksheet #14—Summary of Project Tasks (continued)

The UXO technician will be responsible for testing and inspecting geophysical instruments to be used in support of geophysical anomaly avoidance. Testing and inspection will be performed IAW **Worksheet #22**.

Utility Clearance

A utility locator will be subcontracted to identify and mark out subsurface utilities. Utilities will be identified using all reasonably available as-built drawings, electronic locating devices, and any other means necessary to maintain the safety of DGM anomaly investigation personnel and the protection of the Base infrastructure.

Vegetation Reduction

For vegetation reduction, an instrument-aided visual surface sweep of the land area will be performed by the UXO technician implementing MEC avoidance techniques. During vegetation reduction, the UXO team may use manually operated gas-powered tools, such as weed-eaters and/or chainsaws or mechanically applicable equipment. UXO technician will ensure that vegetation reduction tools/equipment operate a minimum of 6 inches above the ground surface.

DGM Target Reacquisition

Temporary Control Points

Navigational data gathered during the investigation will be correlated with horizontal control based upon a local Third Order (1:10,000) temporary benchmark. All survey data will be provided in Maryland State Plane coordinates, North American Datum 1983 (NAD83) CONUS horizontal datum and units of U.S. Survey Feet. This requirement applies to data provided by the PLS as well as data gathered by other subcontractors.

The PLS subcontractor will be responsible for recovering site-specific control and reacquisition of DGM targets in advance of intrusive investigation. The PLS will use either real time kinematic (RTK) global positioning systems (GPS) or a conventional survey system (e.g. total station), or a combination thereof, to perform land survey work. The UXO technician will implement geophysical anomaly avoidance procedures using handheld geophysical instruments (White's XLT and Schonstedt GA-52Cx).

If control cannot be recovered to within specifications, the PLS will establish at least three temporary benchmarks to be used as control points during site work. For site-specific control points, accuracy for recovered or newly established control points X, Y, Z will be ± 0.1 foot (0.03 meter).

Target Reacquisition

Targets selected for intrusive investigation will be reacquired by the PLS subcontractor using RTK GPS, conventional survey method (total station), or combination thereof IAW SOP-MR-AC-08-01. Flags will be placed at locations 1 foot north of the derived target location as an added safety measure. The anomaly ID will be written in indelible marker on the flag. The flag color choice is at the discretion of the field crew; however, the color red will not be used for reacquisition because this color typically indicates an object requiring explosive detonation. Surveyor paint may be used to spray the location if the field team has concerns that the survey flags may be blown out of place. The coordinates of the reacquired locations will be recorded and download for daily checks for compliance with the SOP.

Worksheet #14—Summary of Project Tasks (continued)

Subsurface Removal

Intrusive Investigation of DGM Targets

The intrusive investigation of anomalies will be initiated by UXO technician IAW the ESS (CH2M, 2015). Mechanical excavation with a backhoe, mini-excavator, or similar equipment will not occur within 12 inches of a target location. Handheld geophysical instruments (White's XLT and Schonstedt GA-52Cx) will be used by the UXO technician to assist in pinpointing the source(s) of anomalies; however, final confirmation of a cleared hole will be performed with an EM61-MK2. Within 12 inches of an anomaly, the excavation team will resume manual excavation with hand tools. Manual excavation will continue until the anomaly source is identified.

The SOPs for anomaly excavation will be provided by the subcontractor once procured; however, the following basic techniques will be used:

- The UXO technician will investigate within a 3.3-foot (1 meter) radius of the flagged anomaly using handheld geophysical instruments (White's XLT and Schonstedt GA-52Cx) for pinpointing assistance.
- Until identified otherwise, the anomaly source is assumed to be MEC/MPPEH. Excavation will begin adjacent to the subsurface target. The excavation will continue until the excavated area has reached a depth below the top of the target as indicated by frequent inspection with the geophysical instruments.
- Using progressively smaller and more-delicate tools to remove the soil carefully, the excavation team will expand the sidewall to expose the metallic item for inspection and ID without moving or disturbing the item.
- Once the item is exposed for inspection, a qualified UXO technician will classify it as MEC, MPPEH, or non-munitions related debris. If identified as MPPEH a second qualified UXO Technician will verify the initial classification.
- Recovered MPPEH inspected and certified as MDAS and non-munitions related debris will be disposed IAW the ESS (CH2M, 2015).
- After a metal object is removed, the area will be rechecked with an EM61-MK2 to determine whether another metal object item was masked by the prior removed item. If the EM61-MK2 indicates a response consistent with the target selection threshold, the excavation team will then annotate the results of the excavation on the dig sheet and in MRSIMS (including the final EM61-MK2 response) and move on to the next DGM target.
- Anomaly locations inspected, along with results of the inspection, will be documented by the MEC subcontractor and provided to the CH2M Project Geophysicist.

If during digging a nail pit, rust flakes, debris, or other localized subsurface feature containing numerous metal objects is identified and an EM61-MK2 response below the target selection threshold cannot be achieved, onsite UXO personnel, in coordination with the UXOQCS and Project Geophysicist, will determine whether the source of the initially reported DGM anomaly has been identified. If so, the dig will be considered complete despite the EM61-MK2 response not measuring less than the target threshold. These findings will be documented in MRSIMS and in the daily QC reports.

Worksheet #14—Summary of Project Tasks (continued)

Anomaly Removal Verification

The following is the procedure to be followed for QC inspections of the intrusive investigation:

- After the dig team completes an intrusive investigation at an anomaly location, the hole is to be left open to the depth investigated and the polyvinyl chloride flag placed in the hole or bent after the investigation is completed.
- The UXOQCS will inspect 10 percent of the intrusively investigated anomaly locations using an EM-61-MK2 to check whether detectable metallic items within a 3.3 feet (1 meter) radius of the hole and within the 4-foot excavation depth have been identified and investigated.
- Holes resulting from intrusive investigations will be backfilled or covered following QC inspection and before the end of the workday.
- Anomaly locations inspected, along with results of the inspection and corrective actions planned (in the event that the UXOQCS decides that inspection results require a change in intrusive team procedures or a re-performance of any work), are documented and provided to the CH2M MR Senior Geophysicist.

Additional QC analysis of intrusive results vs. original amplitude of geophysical anomalies will be performed by the CH2M Project Geophysicist. Anomaly locations that are deemed to need re-investigation through this process will be re-inspected.

MEC/MPPEH Processing

Collecting accurate and detailed data is essential to documenting MEC-related discoveries and resulting disposition of MEC for future reference. Digital MEC and MDAS tracking forms will be used to list data for each MEC/MPPEH item encountered. The MEC/MPPEH tracking form will be filled out with the following information:

- **Unique identity number**—Also to be incorporated in photographs of the item (by using a dry erase board, for example)
- **Location**—Northing and easting coordinates
- **Depth to Item**—If the item is partially buried, depth to the center of the mass of the item (recorded in inches)
- **Orientation**—Geographical direction (N, S, E, W) the item is pointing, unless vertical
- **Type and Nomenclature**—Type of ordnance and nomenclature, as specifically as possible; to also be incorporated in photographs of the item (by using a dry erase board, for example)
- **Filler**—Type of filler, such as none, inert, high explosive, WP, illumination, incendiary, chemical, or smoke
- **Fuze**—Type of fuze, such as none, filler plug, inert, point detonating, powder train, or base detonating
- **Date and Time Found**—Date when the MEC/MPPEH item was found and approximate time it was found
- **Team or Individual**—Team number or individual's name that found the MEC/MPPEH item
- **Disposal**—Disposal status
- **Date Disposed**—Date when the MEC/MPPEH item was disposed of

Worksheet #14—Summary of Project Tasks (continued)

- **Photo ID**—Photo number(s) from camera or ID number if included in photo
- **Comments**—Any noteworthy comments

Management of Recovered MEC/MPPEH and Scrap

A systematic approach will be used for collecting, inspecting and segregating MEC, MPPEH, and non-munitions related debris items recovered from UXO 20. The approach is designed so that materials undergo a continual inspection and evaluation process from the time they are acquired until the items are removed from the site. Recovered MEC/MPPEH and non-munitions related debris will be managed IAW the ESS.

The locations of MEC and MPPEH items will be recorded in MRSIMS, as well as digital photographs collected. The information recorded in MRSIMS will include at a minimum, the item nomenclature if known or can be identified, munition type by function, condition, fuze type, the depth found, the weight, and item condition.

MEC/MPPEH Detonation

Any recovered MEC/MPPEH will be destroyed onsite by detonating the items with donor explosives IAW the ESS. The demolition team will be composed of a minimum of three UXO-qualified individuals and will be responsible for identifying demolition locations, developing site security controls and engineering controls for the demolition events, and delivering and guarding any explosives delivered to the site. The demolition team supervisor will coordinate with the UXOSO, who is not a member of the demolition team. The demolition team supervisor will inspect each post-detonation location after a minimum of 5 minutes have passed to confirm a complete detonation, assess fire hazards, assess the response, and recover potential remaining explosives that were not consumed in the detonation.

Demilitarization Operations

Before demilitarization operations begin, the SUXOS will notify and coordinate with local emergency services to reduce public exposure, maintain safety, and keep the public informed. The emergency contacts and phone numbers are provided in the APP.

All personnel who are nonessential to the operations will be evacuated. The SUXOS will confirm that water traffic and air traffic, are not at risk from an unintentional detonation and intentional detonation. Before demolition charges are primed, all avenues of entry will be physically blocked and positive control will be maintained. ECPs will be established IAW the ESS (CH2M, 2015). Radio communications will be maintained among all concerned parties. Avenues of ingress will not be opened without the express permission of the demolition team supervisor.

While preparing MEC/MPPEH for detonation, the demolition team supervisor will ensure that the number of personnel onsite is kept to the minimum required to safely accomplish the disposal mission. The MEC disposal process will be performed IAW demolition practices outlined in Technical Manual 60A-1-1-31 and manufacturer's guidelines.

During demolition operations, the demolition team supervisor will control and be responsible for explosive disposal operations to ensure the following:

- The area is clear and remains clear of unauthorized personnel.
- Disposal detonations are configured in a manner that precludes fragments from entering inhabited areas and limits blast wave damage to facilities and property.

Worksheet #14—Summary of Project Tasks (continued)

- The UXOSO will have sole custody of and maintain the firing device, and will not delegate or authorize connection to the firing device or initiation of the pyrotechnic chain until the maximum fragment distance is secured for horizontal and vertical fragment distances are evacuated of personnel and aircraft. Only the UXOSO may give permission to the demolition team supervisor to prime a detonation and ignite or fire a detonation.
- The demolition team supervisor will confirm by verbal communication and document the time of communication approval from the UXOSO to authorize an explosion.
- Preparatory activities for demolition are summarized below and detailed in the applicable SOPs listed in **Worksheet #21**:
 - Review of the DDESB-approved ESS for conformance to plan criteria
 - Review of and conform to explosives management plan guidance and requirements
 - Identify MEC or MPPEH item and applicable technical publication for functioning, hazards, safeties, warnings, and/or notes
 - Document (demolition/safety log books) demolition team supervisor and UXOSO review of commercial explosives manufacturer's safety notes, warnings instructions, and material safety data sheets for explosives and, as applicable, initiation or firing device or systems manufacture's guidelines
 - Review POC list, emergency upwind rally points and evacuation points, and location and directions to hospital, and check that detonation and safety support vehicles have directions and map to the hospital with communications and that demolition vehicle has two 20-pound BC-rated fire extinguishers.
 - Check that emergency response equipment identified within APP is on hand
 - Check that two means of communication are available
 - Designate essential personnel to be involved in the operation
 - Acquire protective work materials and implement approved engineering controls

Following the completion of demolition activities, CH2M will notify the Navy RPM to provide a summary of the demolition activities and outcome.

Site Restoration

All open excavations will be backfilled to grade at the end of each workday. In addition, the Navy has provided guidance on seeding of the mowed and un-mowed areas at the site. For the mowed areas, a temporary seed mix of annual rye grass mixed in with a permanent seed mix of Tall Fescue (75 percent), Canada Blue Grass (10 percent), Kentucky Blue Grass (10 percent), and Redtop (5 percent) at 150 lbs. per acre will be used. According to the Navy, the annual rye will germinate in a week and the permanent mix will germinate at about 4 to 6 weeks. For the un-mowed areas, the same annual rye grass mixed in with a permanent seed mix of switchgrass (85 percent), swamp milkweed (5 percent), ironweed (5 percent), and boneset (5 percent) at 150 lbs. per acre will be used. At the end of all excavation activities, hydro seeding of the seed mixes will be applied to the site before demobilizing from the site.

Worksheet #14—Summary of Project Tasks (continued)

Demobilization

Full demobilization of equipment and personnel will occur when site activities are complete and appropriate QA/QC checks have been performed.

Final Reports

After Action Report

An After Action Report will be prepared for UXO 20 after the remedial investigation. The After Action Reports will be prepared IAW NOSSA Instruction 8020.15D (NOSSA, 2013) to document the results of the DGM and MEC intrusive investigations. The reports will provide a summary of all MEC found during the investigation, summarize all the MEC removal activities, and provide an evaluation of the selected removal methods and their relative effectiveness.

RI Report

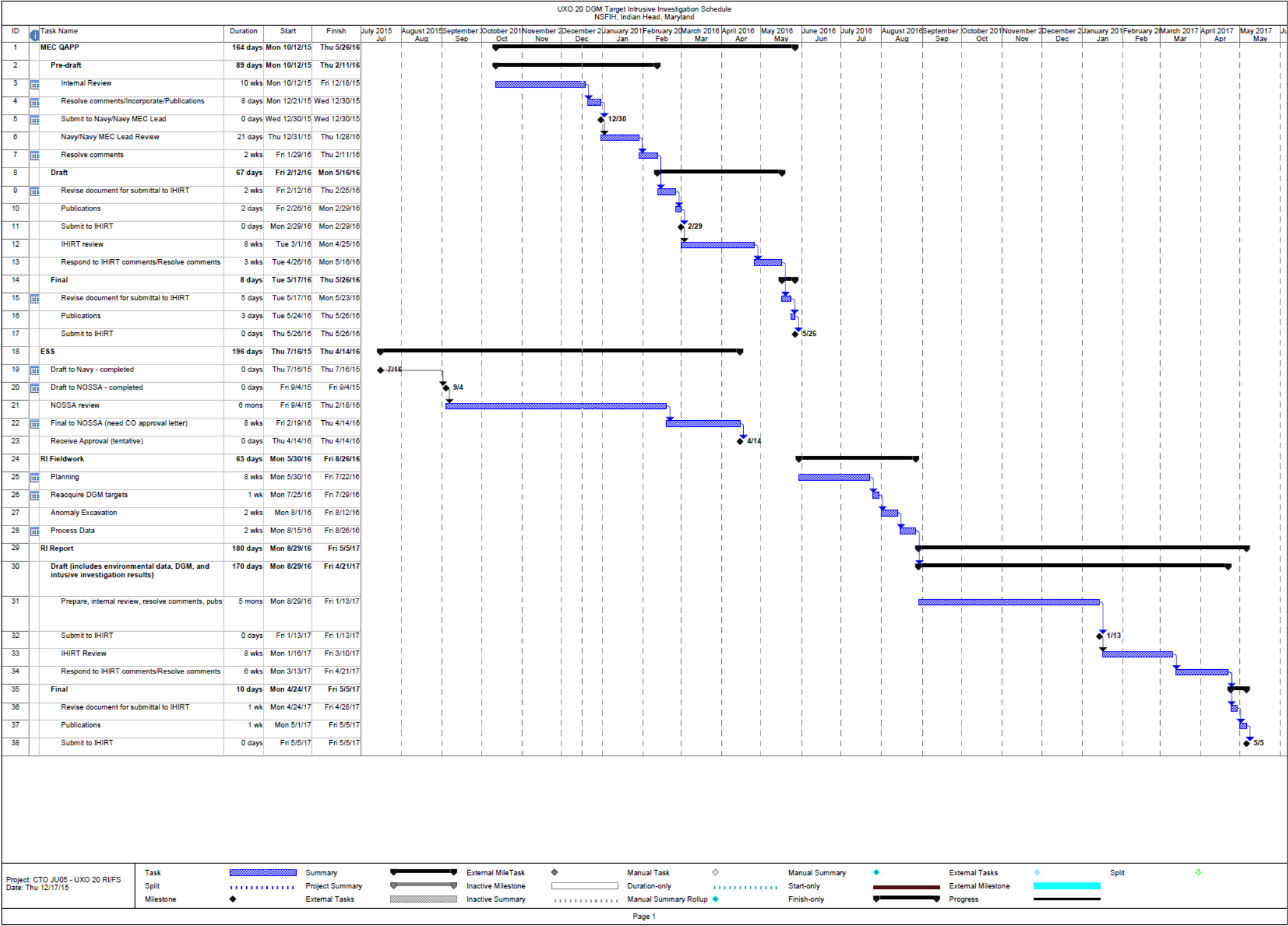
The RI report will be prepared and will include a summary of previous SI and a site history; a physical features description; updated CSMs; a discussion of sampling means and methods; a summary of completed field activities, including DGM and anomaly investigation results; an evaluation of site characterization data, including nature and extent of MEC above the groundwater table, a MEC hazard assessment, conclusions, and recommendations. The RI report will also identify and describe any additional MR actions.

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MEC Item	PAL	PAL Reference	PQL Goal	Validated Detection Limits for Specific Munitions Detection System
Not Applicable				

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Worksheet #16—Project Schedule / Timeline Table



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Worksheet #17—Sampling Design and Rationale

The objective of this intrusive investigation is to characterize, above the groundwater table, the nature and vertical extent of the DGM anomaly sources for 213 targets selected for intrusive investigation. To meet this objective, the DGM targets will be excavated and segregated as MEC, MPPEH, or scrap metal IAW the ESS. The Partnering Team agreed during the September 21, 2015 scoping session (**Worksheet #9**) to the proposed approach for intrusive investigation.

The DFOWs for utility clearing, reacquisition of DGM anomalies, vegetation reduction, and intrusive investigation of DGM anomalies are presented in **Worksheets #12-2** and **#14**.

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Worksheet #18 —Sampling Locations and Methods/SOP Requirements Table (Munitions Response)

Not applicable.

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Worksheet #19—Analytical SOP Requirements Table

[illegible]

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Worksheet #20—Field Quality Control Sample Summary Table

[illegible]

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Worksheet #21—Project Sampling SOP References Table (Munitions Response)*

Reference Number	Title, Revision Number and / or Date	Originating Organization	Equipment Type	Modified for Project Work?	Comments
ES-P06-01-P	Operational Readiness Review (ORR)		ORR Form	No	
MRP SOP-0001	Surface MEC and Geophysical Anomaly Avoidance	CH2M	Handheld geophysical instruments	No.	
SOP MR-AC-08-01	Reacquisition of Subsurface Target Locations	CH2M	Land Surveying Equipment (RTK GPS, total station)	No	PLS scope of work will be written to include required elements from this SOP.
SOP TBD	TBD	MEC Subcontractor	Handheld geophysical instruments, EM61-MK2		Instrument function checks and performance requirements presented in this QAPP will be communicated to subcontractor in their scope of work for incorporation into their SOP(s) for this investigation.

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Worksheet #22—Field Equipment Calibration, Maintenance, Testing, and Inspection Table

See also Worksheet #12-1b.

QC Test	Test Method	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference	Comments
Handheld Geophysical Instrument Function Check	Instruments are carried over known ISO locations in the IVS or other approved ECA.	Each time the instrument is scheduled for use or after batteries are replaced	Instruments can consistently and repeatedly detect known ISO locations.	Replace batteries and retest instrument. If problem persists, remove instrument from service and repair or replace it.	All UXO personnel operating instruments	MRP SOP-0001	UXOQCS to confirm test performed through daily field notes.
EM61-MK2 Warm-up	The system is sufficiently warmed up prior to use.	At the beginning of each day the sensor is scheduled for use.	Warm-up period is at least 15 minutes. Longer warm-up period may be needed during cold weather.	If instrument demonstrates sensor drift, allow it to warm up longer; if problem persists, repair or replace malfunctioning components.	MEC Subcontractor Equipment operator.	SOPs will be provided by subcontractor.	UXOQCS to confirm test performed through daily field notes.

Worksheet #22—Field Equipment Calibration, Maintenance, Testing, and Inspection Table (continued)

QC Test	Test Method	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference	Comments
EM61-MK2 Personnel Test	After nulling, the EM61-MK2 operator monitors the EM61-MK2 response in real-time with sensor kept stationary.	At the beginning of each day the sensor is scheduled for use.	No data spikes or anomalous readings >2 mV on targeting channel are observed due to presence of the sensor operator.	Operator checks pockets for metal objects and reruns the test. If obvious problem with the sensor is identified in the field, it will be replaced before use. Otherwise, the UXOQCS will contact the Project Geophysicist for guidance.	MEC Subcontractor Equipment operator.	SOPs will be provided by subcontractor.	UXOQCS to confirm test performed through daily field notes.

Worksheet #22—Field Equipment Calibration, Maintenance, Testing, and Inspection Table (continued)

QC Test	Test Method	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference	Comments
EM61-MK2 Cable Shake Test	After nulling, the EM61-MK2 operator monitors the EM61-MK2 response in real-time with sensor kept stationary.	At the beginning of each day the sensor is scheduled for use.	No data spikes or anomalous readings >2 mV on targeting channel are observed due to shaking cables and checking connections on the sensor.	Operator checks connections and reruns the test. If obvious problem with the sensor is identified in the field, it will be replaced before use. Otherwise, the UXOQCS will contact the Project Geophysicist for guidance.	MEC Subcontractor Equipment operator.	SOPs will be provided by subcontractor.	UXOQCS to confirm test performed through daily field notes.

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Worksheet #23—Analytical SOP References Table

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Worksheet #25—Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA	Responsible Person	SOP Reference
	Not Applicable							

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Worksheet #26—Sample Handling System

SAMPLE COLLECTION, PACKAGING, AND SHIPMENT
SAMPLE RECEIPT AND ANALYSIS
SAMPLE ARCHIVING
SAMPLE DISPOSAL

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Worksheet #27—Sample Custody Requirements Table

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory):
Laboratory Sample Custody Procedures (receipt of samples, archiving, disposal):
Sample Identification Procedures:
Chain-of-custody Procedures:

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Worksheet #28—Laboratory QC Samples Table

Matrix:

Analytical Group:

Analytical Method/SOP Reference:

QC Sample:	Frequency/Number	Method/SOP QC Acceptance Limits	CA	Person(s) Responsible for CA	DQI	Measurement Performance Criteria
Method Blank						
Laboratory Control Standard (LCS)						
Internal Standards						
System Monitoring Compounds/Surrogates						

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Worksheet #29—Project Documents and Records Table

Document/ Report/Form	Generator	DFOW	Frequency of Completion	Location/Where Maintained
Field Notebook	CH2M FTL	All fieldwork	Daily	CH2M local server, hard copy onsite then in project file
Field Work Plans	CH2M	Pre-mobilization work and all fieldwork	Once before beginning fieldwork	CH2M local server, hard copy onsite then in project file
CA Forms	CH2M	All fieldwork	As necessary	CH2M local server and project file
MRSIMS	CH2M, MEC Subcontractor	Anomaly reacquisition, intrusive investigation of DGM targets, and anomaly source removal verification	Daily	CH2M local server, hard copy onsite and then in project file
Equipment/Instrument check logs	CH2M and Subcontractors	All fieldwork	As necessary	CH2M local server, hard copy onsite then in project file
Daily QC Reports (PP, IP, and FP)	CH2M	All fieldwork	Daily	CH2M local server, hard copy onsite then in project file
Field Photograph Log	CH2M	All fieldwork	Daily/As necessary	CH2M local server
Daily Project Reports	CH2M	All fieldwork	Daily	CH2M local server, hard copy onsite then in project file
Daily Health and Safety Documents	CH2M	All fieldwork	Daily	CH2M local server, hard copy onsite then in project file
Training Records	CH2M and Subcontractors	All fieldwork	Before mobilization to the site	Hard copy onsite and with UXOQCS
Meeting Agendas, Minutes, Presentation, etc.	CH2M	All DFOWs	As necessary	CH2M local server
After Action Report	CH2M	After Action Report	Once upon completion of site activities	CH2M local server
RI Report	CH2M	Final report	Once upon completion of entire investigation	CH2M local server

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Worksheet #30—Analytical Services Table

Matrix	Analytical Group	Sample Locations/ ID Number	Analytical Method	Data Package Turnaround Time	Laboratory / Organization	Backup Laboratory / Organization

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Worksheet #31—Planned Project Assessments Table

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment	Person(s) Responsible for Responding to Assessment Findings	Person(s) Responsible for Identifying and Implementing CA	Person(s) Responsible for Monitoring Effectiveness of CA
Field Performance Audit	Once during field event	Internal	CH2M	CH2M UXOQCS and/or MR Quality Manager	MEC Subcontractor	UXOQCS and/or MR Quality Manager/CH2M	PM/CH2M
Field Audit to verify equipment function checks and QC tests are performed	As needed	Internal	CH2M	CH2M UXOQCS and/or Project Geophysicist	MEC Subcontractor	Project Geophysicist or UXOQCS/CH2M	PM/CH2M
Field Performance Audit to verify removal of excavated anomaly sources	Once at the end of the intrusive investigation	Internal	CH2M	UXOQCS and/or Project Geophysicist	MEC Subcontractor	UXOQCS/CH2M	PM/CH2M

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Worksheet #32—Assessment Findings and Corrective Action Responses

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings	Timeframe of Notification	Nature of CA Response Documentation	Individual(s) Receiving CA Response	Timeframe for Response
Field Performance Audit	Checklist and Written Audit Report	CH2M PM	Within 1 week of audit	Memorandum	CH2M SUXOS CH2M Senior Geophysicist	Within 1 week of receipt of CA Form

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Worksheet #32-1—Corrective Action Form

Person initiating corrective action (CA) _____ Date _____

Description of problem and when identified (Submit a drawing/sketch if necessary): _____

Cause of problem, if known or suspected: _____

Resolution/Sequence of CA: (including date implemented, action planned and personnel/data affected) _____

CA implemented by: _____

Date: _____

CA initially approved by: _____

Date: _____

Follow-up date: _____

Final CA approved by: _____

Date: _____

Information copies to:

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Worksheet #32-2—Field Performance Audit Checklist

Project Responsibilities

Project No.: _____

Date: _____

Project Location: _____

Signature: _____

Team Members

Yes	No	1) Is the approved work plan being followed?
		Comments _____

Yes	No	2) Was a briefing held for project participants?
		Comments _____

Yes	No	3) Were additional instructions given to project participants?
		Comments _____

DGM Operations

Yes	No	1) Are routine inspections and QC checks of the equipment being performed as outlined in this MEC QAPP?
		Comments _____

Yes	No	2) Is the proposed location of transect lines clearly communicated with DGM Survey Team?
		Comments _____

Yes	No	3) Is data collection being performed as required by the MEC QAPP?
		Comments _____

Yes	No	4) Are data stored properly and uploaded for transfer in a timely manner?
		Comments _____

Yes	No	5) Are photographs taken and documented?
		Comments _____

Worksheet #32-2—Field Performance Audit Checklist (continued)

Document/Data Control

Yes	No	1) Are all work plan documents available onsite for review?
		Comments _____

Yes	No	2) Are daily reports and other documentation completed as required by the MEC QAPP?
		Comments _____

Yes	No	3) Are equipment QC data and collected field data properly transferred for review?
		Comments _____

Worksheet #33—QA Management Reports Table

Type of Report	Frequency	Projected Delivery Date	Person Responsible for Report Preparation	Report Recipient(s)
Daily QC Report	Daily	Following day	SUXOS/Field Engineer/UXOQCS	Navy
QC Meeting Minutes	Post Meeting	Within 7 days	SUXOS/Field Engineer/UXOQCS	Navy
Preparatory Inspection Forms	Once for each applicable definable feature of work (before start of task)	With daily reports the following day after meeting	SUXOS/Field Engineer/UXOQCS	Navy
Initial Inspection Forms	Once for each applicable definable feature of work (before start of task)	With daily reports the following day after meeting	SUXOS/Field Engineer/UXOQCS	Navy
Follow-Up Inspection Forms	Once for each applicable definable feature of work (document in daily reports)	Document in daily reporting	SUXOS/Field Engineer/UXOQCS	Navy
RI Report	Post-field event	See Worksheet #16	PM	Stakeholders, see Worksheet #4

The RI report will include the following:

- Executive Summary
- Introduction: Describe the objectives and scope of the RI, as well as the organization of the RI report.
- Environmental Setting: Describe the current and historical land uses associated with NSFII and UXO 20, discuss previous investigations conducted at the site, and summarize the physical characteristics of the site, such as climate, geology, hydrology, and ecology.
- RI Activities: Provide details of the sampling and data gathering methods and approaches used during the field activities.
- Investigation Findings: Present the analytical data pertaining to each media type, DGM and intrusive results, and assesses the nature and extent of contamination and MEC/MPPEH at the site.
- Contaminant Fate and Transport: Describe contaminant migration at the sites in the context of the mobility and persistence of the contamination.
- MEC Explosive Risk Evaluation
- Human Health Risk Assessment: Describe the potential effects of identified contaminants on human health.
- Ecological Risk Assessment: Describe the potential effects of identified contaminants on the environment.

Worksheet #33—QA Management Reports Table (continued)

- **Conclusions and Recommendations:** Summarize the results of the RI, and the potential risks posed to human health and the environment, and potential MEC hazard, as well as provide recommendations for additional activities at the site.

Supplemental information, such as figures, tables, soil boring and monitoring well construction logs, well permits, survey data, raw analytical data, DGM data, intrusive anomaly data, human health and environmental risk assessment supporting calculations, and the MEC hazard analysis supporting calculations will be included as appendices to the report.

Worksheet #34—Verification (Step I) Process Table

Verification Input	Description	Internal/External	Responsible for Verification (name, organization)
Evidence of required approval of plan (MEC QAPP)	Evidence of approval and completeness of MEC QAPP. Includes establishment of PQOs, QC criteria, SOPs, project-specific action limits, figures, etc.	Internal	PM CH2M
Site-Specific Training Records	Ensure project personnel have proper training and certification to perform site activities and achieve project data quality objectives (DQOs)	Internal	PM and SUXOS/UXOSO/ CH2M
Data Collection and Transfer	Ensure data collection is complete and recorded accurately and that data transfer protocol are adequate.	Internal	UXOQCS/Project Geophysicist/CH2M
Performance requirements (including QC criteria)	Ensure performance requirements are fully established (see Worksheet #12-1b and Worksheet #22).	Internal	UXOQCS/Project Geophysicist/CH2M
Field Log Notebooks	Field notes will be reviewed to ensure completeness of field data collection, data collection times, onsite operations, site conditions, etc. The logbook will also be used to document, explain, and justify all deviations from the approved MEC QAPP and other work planning documents.	Internal	PM and SUXOS/UXOQCS/ CH2M

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Worksheet #35—Validation (Steps IIa and IIb) Process Table

Step IIa ¹ /IIb	Validation Input	Description	Responsible for Validation (name, organization)
IIb	Onsite Screening	Ensure that all field data meet requirements for completeness and accuracy based on the field calibration records.	SUXOS/UXOQCS CH2M
IIa	Performance requirements (including QC criteria)	Establish that quality objectives are met (see Worksheet #12) and QC tests were performed and compliant with Worksheet #22 .	UXOQCS and Project Geophysicist CH2M
IIa	Field Log Notebooks	Review field logbooks, field documents, and data deliverables for compliance to methods and signatures.	UXOQCS and PM CH2M
IIb	Performance requirements (including QC criteria)	Ensure that the data report has been provided and that all data is complete. Evaluate if all data collection procedures were followed with respect to the equipment and QC process.	UXOQCS and Project Geophysicist CH2M

¹ IIa=compliance with methods, procedures, and contracts

IIb=comparison with measurement performance criteria (MPC) in the QAPP

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Worksheet #36—Validation (Steps IIa and IIb) Summary Table

Step IIa ¹ /IIb	Matrix	Analytical Group	Validation Criteria	Data Validator (title and organizational affiliation)
IIa	N/A	Anomaly sources identified during intrusive investigation	Recovered objects agree with initial DGM target amplitude and anomaly characteristics or otherwise, the findings are sufficiently explained.	CH2M Project Geophysicist

¹ IIa=compliance with methods, procedures, and contracts

IIb=comparison with MPC in the QAPP

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Worksheet #37—Usability Assessment

Summarize the usability assessment process and all procedures, including interim steps and any statistics, equations, and computer algorithms that will be used:

- If all QC criteria and quality objectives are met, then the data are usable.
- If QC criteria and quality objectives are not met, then the RCA/CA process will be implemented and data usability assessment performed.

Describe the evaluative procedures used to assess overall measurement error associated with the project.

- Data checks will be performed to assess whether tasks are performed IAW the criteria established in this MEC QAPP. Checks will include computing offsets between PLS measurements and supplied target coordinates, review of UXOQCS daily reports for documentation of completion of instrument QC checks and QC inspections, and review of MRSIMS reports to determine that entries are correct and complete.
- As required, the RCA/CA process will be undertaken to evaluate impact on data usability and decision making.

Describe the documentation that will be generated during the usability assessment and how usability assessment results will be presented so that they identify trends, relationships (correlations), and anomalies:

- Graphical representations and site representative figures will be produced to record the locations of munitions items recovered during the intrusive investigation.
- The RI report will identify limitations and make recommendations for future investigations, if necessary.
- A data quality evaluation section will be included as part of the RI report to summarize QC results and DQOs.

Identify the personnel responsible for performing the usability assessment.

- The PM, Project Geophysicist, and other team members will be responsible for collecting and compiling the data. The data will then be presented to the IHIRT who will evaluate the data usability according to project objectives.

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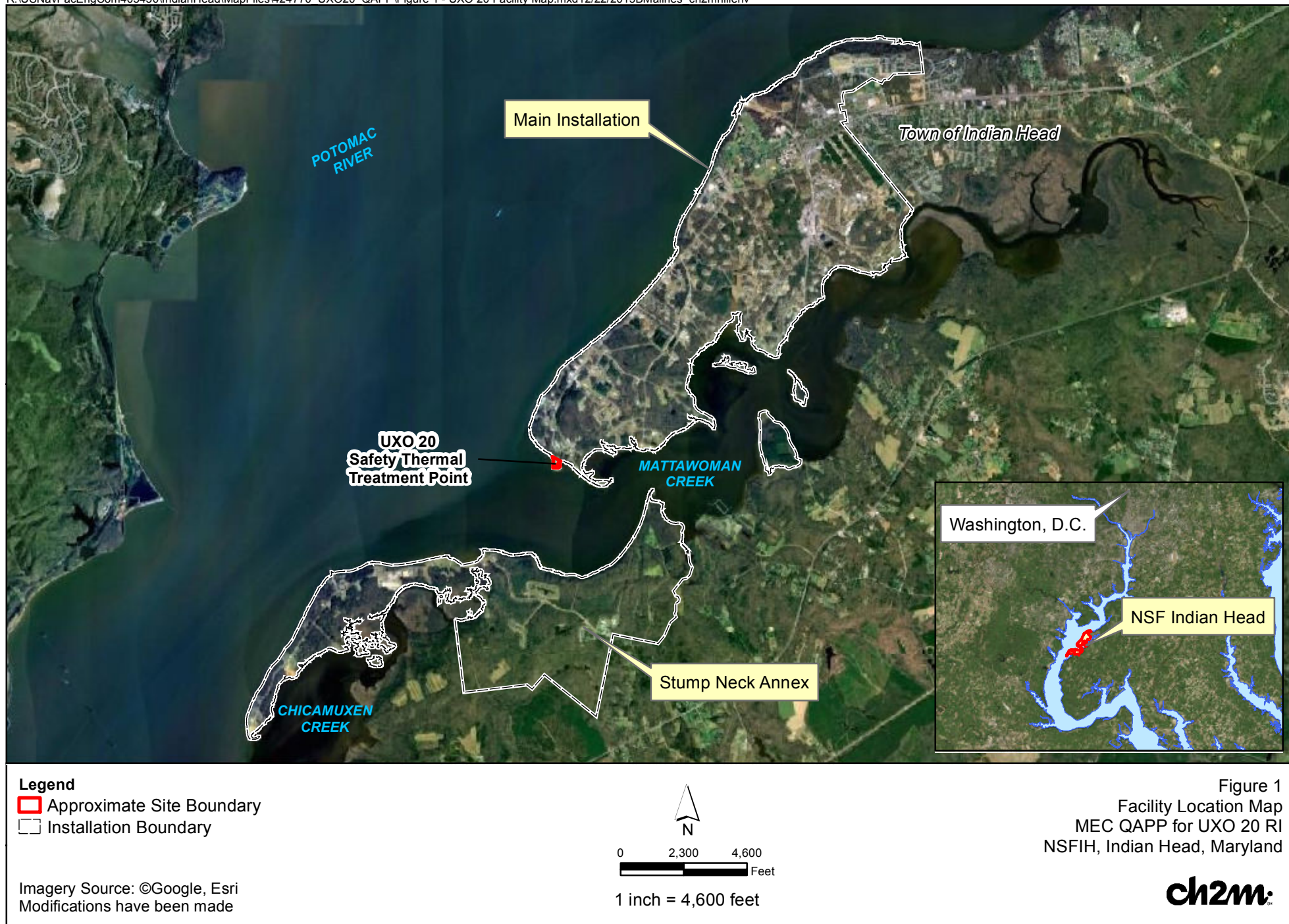
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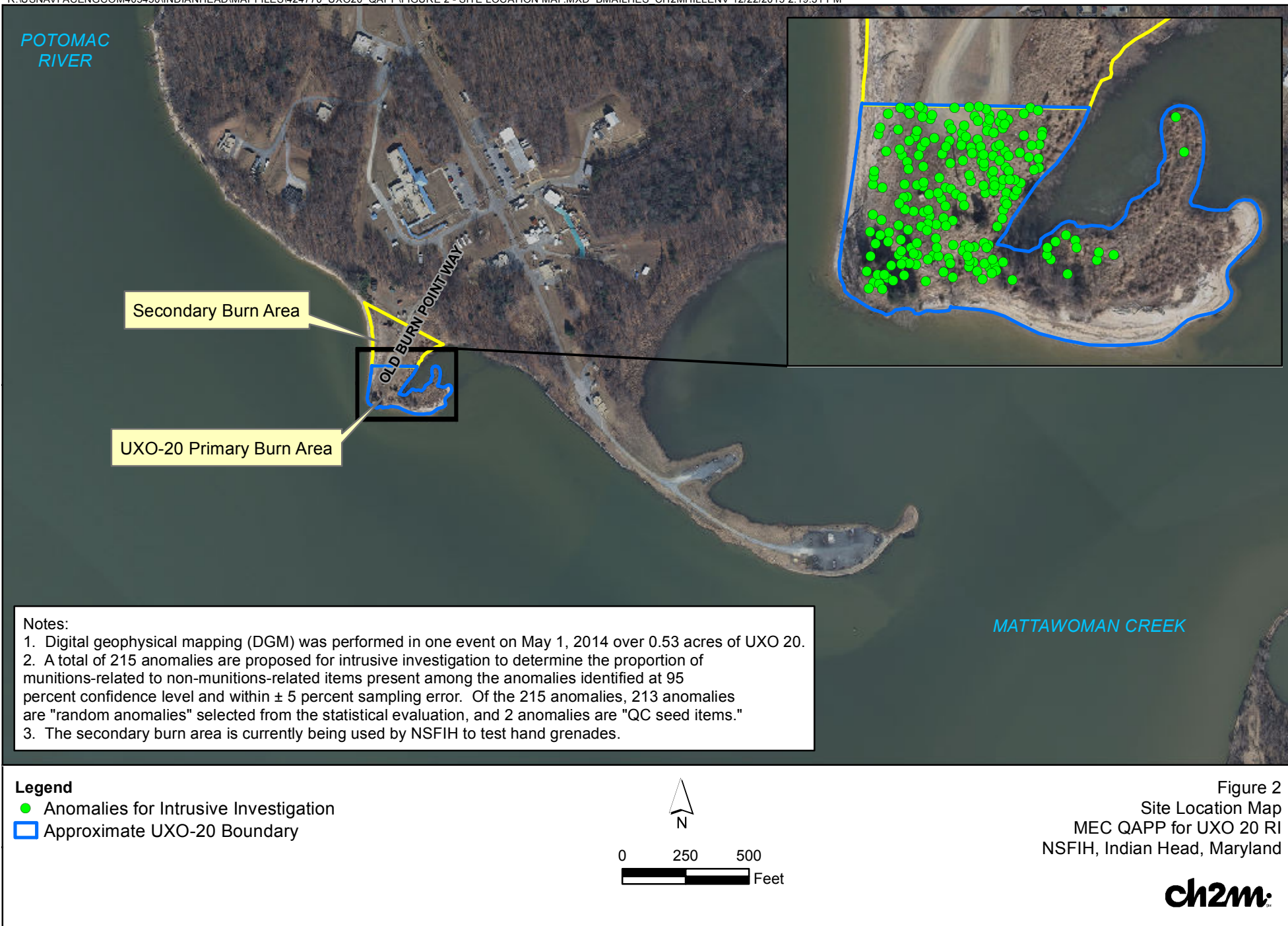
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Figures





Current and Future Navy Personnel (Military and Civilian) Maintenance Workers and Contractors:

Potential exposure to MEC/MPPEH items at the surface during working and walking. Potential exposure to MEC/MPPEH in the subsurface during intrusive activities.

Visitors and Current and Future Trespassers:

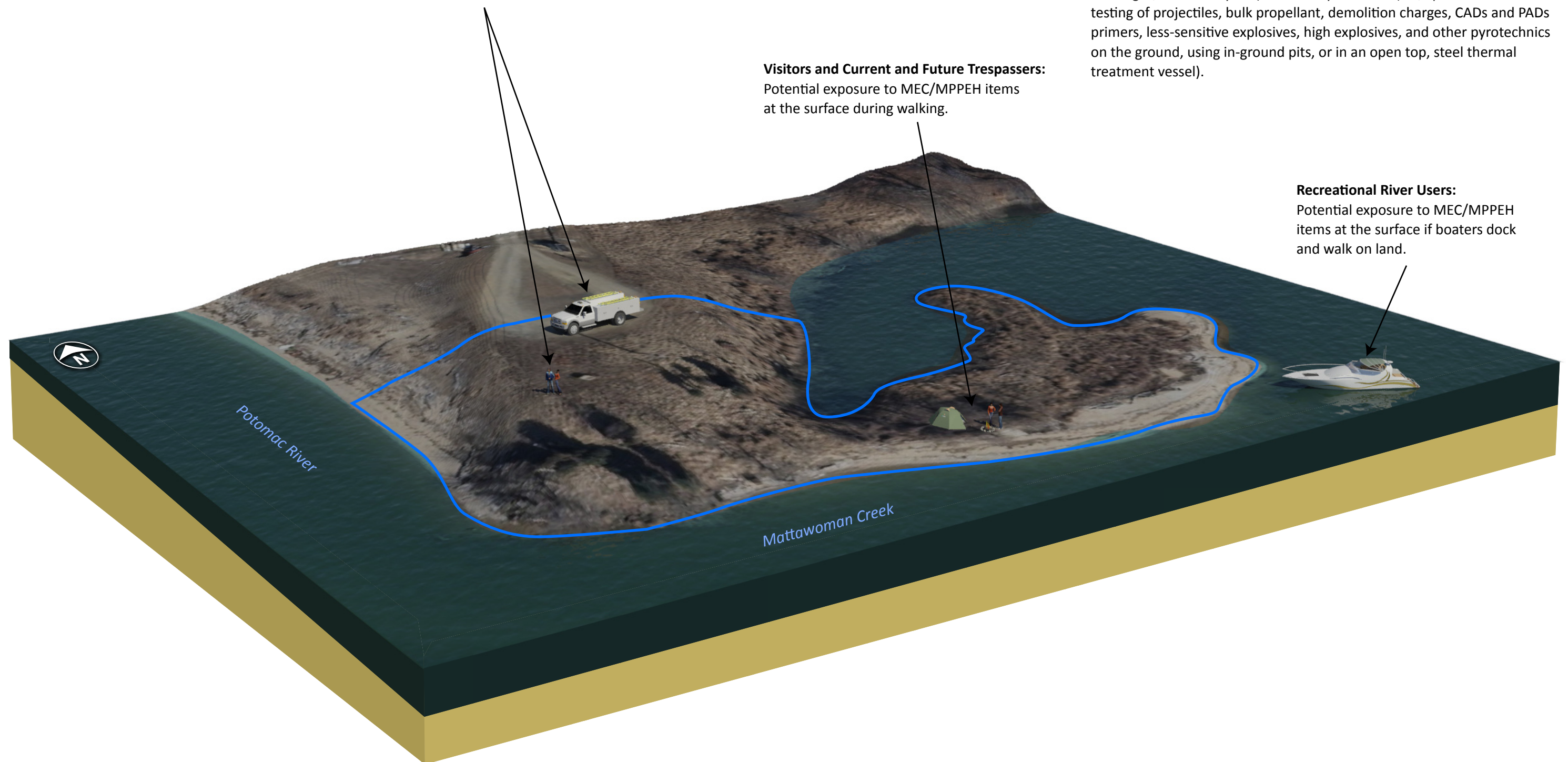
Potential exposure to MEC/MPPEH items at the surface during walking.

Recreational River Users:

Potential exposure to MEC/MPPEH items at the surface if boaters dock and walk on land.

Sources:

The sources of potential MEC/MPPEH are associated with the materials used to construct the site (sand, fill material, rocket motor casings, empty cartridges, and coal fly ash) and facility activities (OB/open detonation and testing of projectiles, bulk propellant, demolition charges, CADs and PADs primers, less-sensitive explosives, high explosives, and other pyrotechnics on the ground, using in-ground pits, or in an open top, steel thermal treatment vessel).



LEGEND

— Approximate UXO 20 Site Boundary

Not to Scale

Figure 3. Conceptual Site Model

MEC QAPP for UXO 20 RI

NSFIH, Indian Head, Maryland

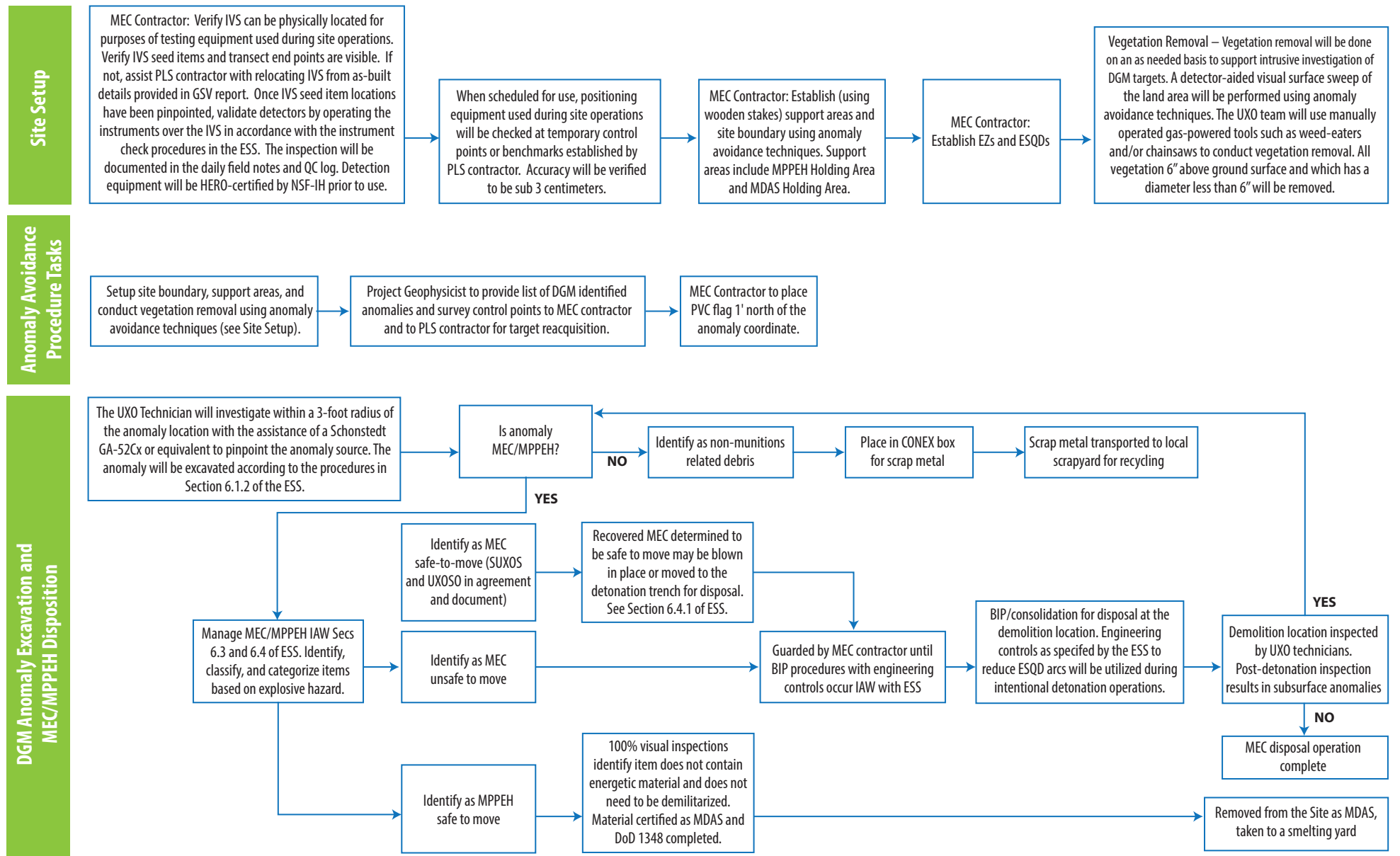


Figure 4

UXO 20 MEC and MPPEH Flowchart

FIGURE 4. UXO 20 MEC and MPPEH Flowchart

UXO 20 MEC and MPPEH Flowchart Representing Post-DGM Site Activities

UFP-QAPP for UXO 9 and UXO 11 Remedial Investigations NSF-IH, Indian Head, Maryland

Appendix A

Standard Operating Procedures

Preparing Field Log Books

I. Purpose

This SOP provides general guidelines for entering field data into log books during site investigation and remediation activities.

II. Scope

This is a general description of data requirements and format for field log books. Log books are needed to properly document all field activities in support of data evaluation and possible legal activities.

III. Equipment and Materials

- Log book
- Indelible pen

IV. Procedures and Guidelines

Properly completed field log books are a requirement for much of the work we perform under the Navy CLEAN contract. Log books are legal documents and, as such, must be prepared following specific procedures and must contain required information to ensure their integrity and legitimacy. This SOP describes the basic requirements for field log book entries.

A. PROCEDURES FOR COMPLETING FIELD LOG BOOKS

1. Field notes commonly are kept in bound, hard-cover logbooks used by surveyors and produced, for example, by Peninsular Publishing Company and SESCO, Inc. Pages should be water-resistant and notes should be taken only with water-proof, non-erasable permanent ink, such as that provided in Sanford Sharpie® permanent markers.
2. On the inside cover of the log book the following information should be included:
 - Company name and address
 - Log-holders name if log book was assigned specifically to that person
 - Activity or location

- Project name
 - Project manager's name
 - Phone numbers of the company, supervisors, emergency response, etc.
3. All lines of all pages should be used to prevent later additions of text, which could later be questioned. Any line not used should be marked through with a line and initialed and dated. Any pages not used should be marked through with a line, the author's initials, the date, and the note "Intentionally Left Blank."
 4. If errors are made in the log book, cross a single line through the error and enter the correct information. All corrections shall be initialed and dated by the personnel performing the correction. If possible, all corrections should be made by the individual who made the error.
 5. Daily entries will be made chronologically.
 6. Information will be recorded directly in the field log book during the work activity. Information will not be written on a separate sheet and then later transcribed into the log book.
 7. Each page of the log book will have the date of the work and the note takers initials.
 8. The final page of each day's notes will include the note-takers signature as well as the date.
 9. Only information relevant to the subject project will be added to the log book.
 10. The field notes will be copied and the copies sent to the Project Manager or designee in a timely manner (at least by the end of each week of work being performed).

B. INFORMATION TO BE INCLUDED IN FIELD LOG BOOKS

1. Entries into the log book should be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on the collector's memory. Entries must be legible and complete.
2. General project information will be recorded at the beginning of each field project. This will include the project title, the project number, and project staff.
3. Scope: Describe the general scope of work to be performed each day.
4. Weather: Record the weather conditions and any significant changes in the weather during the day.
5. Tail Gate Safety Meetings: Record time and location of meeting, who was present, topics discussed, issues/problems/concerns identified,

and corrective actions or adjustments made to address concerns/problems, and other pertinent information.

6. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE), record air monitoring data on a regular basis and note where data were recording (e.g., reading in borehole, reading in breathing zone, etc). Also record other required health and safety procedures as specified in the project specific health and safety plan.
7. Instrument Calibration; Record calibration information for each piece of health and safety and field equipment.
8. Personnel: Record names of all personnel present during field activities and list their roles and their affiliation. Record when personnel and visitors enter and leave a project site and their level of personal protection.
9. Communications: Record communications with project manager, subcontractors, regulators, facility personnel, and others that impact performance of the project.
10. Time: Keep a running time log explaining field activities as they occur chronologically throughout the day.
11. Deviations from the Work Plan: Record any deviations from the work plan and document why these were required and any communications authorizing these deviations.
12. Health and Safety Incidents: Record any health and safety incidents and immediately report any incidents to the Project Manager.
13. Subcontractor Information: Record name of company, record names and roles of subcontractor personnel, list type of equipment being used and general scope of work. List times of starting and stopping work and quantities of consumable equipment used if it is to be billed to the project.
14. Problems and Corrective Actions: Clearly describe any problems encountered during the field work and the corrective actions taken to address these problems.
15. Technical and Project Information: Describe the details of the work being performed. The technical information recorded will vary significantly between projects. The project work plan will describe the specific activities to be performed and may also list requirements for note taking. Discuss note-taking expectations with the Project Manager prior to beginning the field work.
16. Any conditions that might adversely affect the work or any data obtained (e.g., nearby construction that might have introduced excessive amounts of dust into the air).

17. Sampling Information; Specific information that will be relevant to most sampling jobs includes the following:
- Description of the general sampling area – site name, buildings and streets in the area, etc.
 - Station/Location identifier
 - Description of the sample location – estimate location in comparison to two fixed points – draw a diagram in the field log book indicating sample location relative to these fixed points – include distances in feet.
 - Sample matrix and type
 - Sample date and time
 - Sample identifier
 - Draw a box around the sample ID so that it stands out in the field notes
 - Information on how the sample was collected – distinguish between “grab,” “composite,” and “discrete” samples
 - Number and type of sample containers collected
 - Record of any field measurements taken (i.e. pH, turbidity, dissolved oxygen, and temperature, and conductivity)
 - Parameters to be analyzed for, if appropriate
 - Descriptions of soil samples and drilling cuttings can be entered in depth sequence, along with PID readings and other observations. Include any unusual appearances of the samples.

C. SUGGESTED FORMAT FOR RECORDING FIELD DATA

1. Use the left side border to record times and the remainder of the page to record information (see attached example).
2. Use tables to record sampling information and field data from multiple samples.
3. Sketch sampling locations and other pertinent information.
4. Sketch well construction diagrams.

V. Attachments

Example field notes.

MRP – SOP – 0001
MUNITIONS RESPONSE PROGRAM (MRP)
STANDARD OPERATING PROCEDURE (SOP)
SURFACE MUNITIONS AND EXPLOSIVES OF CONCERN (MEC)
& SUBSURFACE ANOMALY AVOIDANCE

1.0 OBJECTIVE:

Provide safe procedures to avoid Munitions and Explosives of Concern (MEC) during visitor/ personnel escort, land survey, vegetation reduction, sediment sampling, soil boring, drilling, direct push technology-core sampling, or other environmental or construction activities conducted in an environment where the presence of MEC is suspected.

2.0 PURPOSE:

This SOP provides guidance for avoiding surface MEC (e.g., Unexploded Ordnance (UXO), Discarded Military Munitions (DMM)), Material Potentially Presenting an Explosive Hazard (MPPEH), and subsurface anomalies.

3.0 APPLICABILITY:

This SOP applies MEC avoidance procedures per Department of Army Engineering Pamphlet (EP) 75-1-2 Munitions and Explosives of Concern Support During Hazardous Toxic and Radioactive Waste (HTRW) and Construction Activities.

4.0 TECHNICAL GUIDANCE:

This SOP lists processes and procedures that comply with the following sources:

- DOD 6055.09-M, Ammunition and Explosives Safety Standards, February 2008
- USN Environmental Restoration Program (MRP Chapter 12) August 2006
- NAVSEA OP 5 Volume 1, Ammunition and Explosives Safety Ashore, July 2009;
- NOSSA Instruction 8023.11(series), Standard Operating Procedure Development
- USAF Manual 91-201, Explosive Safety Standards, November 2008
- DA Pamphlet 385-64, Ammunition and Explosives Safety Standards, October, 8, 2008
- DA Field Manual (FM) 21-16, Unexploded Ordnance (UXO) Procedures, August, 1994
- DA Engineering Manual (EM) 1110-1-4009, Military Munitions Response Actions, June, 2007
- DA Engineering Pamphlet (EP) 1110-1-18, Military Munitions Response Process, April 2006
- DA Engineering Manual (EM) 385-1-97, Explosives, Health and Safety, September 2008
- **Note: Electronic copies for the sources listed above are available via CH2M HILL SUXOS Laptop Computer**

5.0 SOP VALIDATION RECORD:

SOP Title: MEC Anomaly Avoidance.....Work Instruction Identification/
SOP: # MRP-SOP-0001

Author: K. Lombardo Date: December 1, 2009.....Revision Date: 02/16/2012

Review: G. DeMetropolis, Date: February 16, 2012Approval; J. Bowles

Validation Date: December 14, 2009Process Observer: Kevin Lombardo,
December 14, 2009

6.0 HAZARDOUS MATERIALS:

Hazardous Chemicals: None; Product Name: N/A; Material Safety Data Sheets: N/A;
Health Hazards: N/A

7.0 EMERGENCY RESPONSE INFORMATION

Work Site Name (location) address/building # Street):

Nearest intersection (cross streets) or entrance gate:

Safe Area Rally Point (gate/building or intersection) Note: Rally Point should be upwind of work location:

UXO Qualified Technician Incident Commander: (name) _____

Personnel Injury or Medical Distress:

1. Summon Emergency Medical Services (EMS)
2. Administer First Aid and/or CPR
3. Notify Project Manager
4. PM implements CH2M HILL SOP 111, Incident Notification, Reporting, and Investigations.

Fire:

1. Evacuate personnel from the Munitions Response Site and Area to safe rally point
2. Notify Fire Department of "Work site Name," fire location, and personnel safe rally point
3. Obtain head count, ensuring all personnel are present and or accounted for.
4. Notify Project Manager
5. PM implements CH2M HILL SOP 111, Incident Notification, Reporting, and Investigations.

(Fire/Rescue radio call sign): _____ **Phone #** _____

Medical Services radio call sign: _____ **Phone #** _____

Range Control radio call sign: _____ **Phone #** _____

Project Manager POC: _____ **Phone #** _____

Identify local disaster warning system (radio, PA, phone, other): _____

Flag(s): _____

Warning Bells/Horns/Sirens/Lights/Strobes: _____

Public Address System: _____

Weather Radio Channel: _____

Other: _____

8.0 PERSONNEL ROLES AND RESPONSIBILITY

Note: Roles and responsibilities are dependent upon work plan direction; one or all roles and responsibilities may be applicable.

1. Project/Construction Manager (P/CM): Provides the necessary resources and personnel to safely and efficiently accomplish the scope of work. Ensures CH2M HILL unexploded ordnance (UXO) personnel shall be qualified in accordance with:
 - OPNAVINST 8020.14/MCO P8020.11 (series).
 - And are certified to perform the job assigned and that the certification is current. Contractors who perform those duties described in NAVSEA OP5, paragraph 2-3 involving ammunition and explosives shall comply with NAVMED P117 Article 15-107.
 - Prior to site operations, CH2M HILL will verify training, medical qualification statements by physicians, and conformance to substance abuse testing and reporting programs.
 - Shall confirm active explosive certification program conformance for personnel compliance to requirements for UXO personnel identified IAW DDESB Technical Paper (TP) 18, and monitors these personnel for conformance to the Bureau of Alcohol, Tobacco, Firearms, and Explosives, Safe Explosives Act 2003 Certification requirements for "Employee Possessor," and or "Responsible Person."
2. Senior UXO Supervisors or Unexploded Ordnance Technician III or II: Supervises the operational resources necessary to implement, and accomplish this procedure and requirements set forth within the Work, Health, Safety, Quality and Accident Prevention Plans. May stop work at anytime to prevent accidents, remedy unsafe conditions, stop an unsafe act, or question the safety of a process or procedure or

observe non conformance to this SOP and/or plans. Provides a Site Specific Tailgate Safety Briefing to include MEC, construction, industrial, environmental, and natural safety hazard awareness. Provides the plan of day. As applicable provides a Hazardous Materials briefing for items used, consumed, or required for this SOP. Brief personnel on communications, security, emergency/ medical response, evacuation, rally points, IAW with project instructors, and plans. Also, informs personnel to prevent disclosure of classified work, site observations, or information.

3. Non-UXO Qualified Personnel are obligated to follow guidance within this SOP, Work, Health and Safety and Accident Prevention Plans.

9.0 PRE-OPERATIONAL CHECK LIST

1. () CH2M HILL Inc. Safety Risk Evaluation (SRE) and Explosives Safety Submission Determination (ESSD) (Navy Projects)	2. () Project Task/Work/ Instructions
3. () Work Plan/Accident Prevention Plan/ Health and Safety Plan	4. () Personal Protective Equipment (PPE) IAW Safety Plan
5. () Emergency P.O.C List	6. () Directions and map to hospital
7. () Communications (2 methods)	8. () First aid/Fire Extinguisher/- (GPS/compasses optional)

10.0 ANOMALY DETECTION EQUIPMENT (as required by project instruction)

() Ferrous Metal Detector (Schonstedt GA 52CX or Ferex 4.021 MK 26 Mod 0 or equivalent), with extra batteries, carry case, & instruction manual (as required by project instructions)

() All Metals Detector (White Spectrum XLT or equivalent) with extra battery, carry case, & instruction manual (as required by project instructions)

() Down-hole Instrument Direct Push Technology – Schonstedt MG 230 Gradiometer maximum 2.12-inch "Outside Diameter" (OD) Probe Head - Extra batteries and instruction manual (as required by project instructions)

11.0 EXPLOSIVE ORDNANCE RECONNAISSANCE EQUIPMENT

WARNING

Direct physical contact with or movement of MEC or MPPEH is not authorized.

() Tape Measure, ruler, pen/paper, item for scale perspective (e.g. dollar bill),

() Camera (digital), with spare batteries (as required by project instructions)

() Small dry erase white board and dry erase marker for photograph item number, date, time, location, and description.

12.0 GENERAL INFORMATION	
CATEGORY Surface MEC/Anomaly Avoidance	DIRECTIONS (S) = Safety, (O) = Operations, (Q) = Quality Control
<p>Note: (o) PM shall obtain MISS Utilities Check and or local Dig (intrusive) permits prior to intrusive actions (such as use of direct push technology, drilling, and use of hand augers)</p> <p style="text-align: center;">(WARNING)</p> <p>Fire: (s) Do not attempt to fight a fire, evacuate area, move upwind or crosswind to safe rally point, notify fire department.</p> <p>Wildlife: (s) Aggressive/ defensive – Avoid wildlife –withdraw from area</p> <p>Hunters: (s) Withdraw from area, retreat to vehicle, contact project authority</p> <p>CWM: (s) Evacuate upwind to safe rally point, mark area on map, contact PM</p> <p>Severe Weather (lighting, winds, and storms): (s) Evacuate to vehicle, follow PM guidance</p>	
13.0 SAFETY	
Munitions Response Group Safety Manager	George DeMetropolis/SDO Telephone (Office): (619) 687 – 0120, Ext. 37239 Telephone (Cellular): (619) 564 – 9627
Safety Plan, Accident Prevention Plan and Activity Hazard Analysis	(s) All field personnel require reading, compliance, and acknowledging they understand and comprehend the safety information contained within these plans, SOP and AHA; attesting through signature and date
Visitors access to work location	(s) All visitors (contract/transient/witness) require a safety briefing, wearing of PPE IAW site specific safety plan, and conformance to UXO Technician instructions.
Safety Meeting:	(s) Each morning – Project Personnel shall participate in a tailgate safety briefing, discussing the operational activities (plan of the day), MEC/HTRW hazards/risks, safety controls, and emergency procedures; daily weather forecast, work activity OSHA PPE

	level, insect/poisonous plant avoidance, and heat/cold stress prevention. Personnel shall sign and date, the safety briefing acknowledgment form; confirming individual participation, understanding, and comprehension prior to operations. Personnel who do not participate in the safety briefing or, understand, or comprehend the safety briefing may not access work areas.
Safety Pre-field operations check list	<p>(s) (<input type="checkbox"/>) First Aid Kit (serviceable and supplies within shelf life)</p> <p>(s) (<input type="checkbox"/>) Fire Extinguisher 10BC (or greater) (charged/indicator green)</p> <p>(s) (<input type="checkbox"/>) Water (minimum 1 liter per person)</p> <p>(s) (<input type="checkbox"/>) Cell phone/identified alternate land line location/or two/way Radio</p> <p>(s) (<input type="checkbox"/>) Identification of wind direction, and rally points</p> <p>(s) (<input type="checkbox"/>) PPE IAW Activity Hazard Analysis</p> <p>(s) (<input type="checkbox"/>) Vehicles unlocked; keys in announced location</p> <p>(s) (<input type="checkbox"/>) Insect repellant/sun screen (available)</p>
Equipment Check-out: <ol style="list-style-type: none"> 1) Schonstedt – GA52CX magnetometer or equivalent 2) White’s (E series) Spectrum model XLT Metal Detector or equivalent 3) Schonstedt gradiometer MG 230 for Down-hole or underwater search or equivalent 4) Forster Ferex 4.021 models K,L, & W or MK 26 MOD 0 magnetometer for down-hole or underwater search or equivalent 	<p>(o) Assemble/inspect, IAW manufacture instructions</p> <p>(o) Test geophysical instruments against a known source (ferrous or non-ferrous) for instrument response.</p> <p>(o) Source (ferrous) Schedule 40, 2-inch x 5-inch steel pipe or equivalent</p> <p>(q) Pass/Fail - instrument shall detect source on surface at 12-inches above item/fail non-detect - replace instrument</p> <p>(o) Source on surface (non-ferrous) ¾-inch x 6-inch Brass Pipe nipple (aka) couple fitting or equivalent</p> <p>(q) Pass/Fail - instrument shall detect source on surface at 6-inches above item/fail non-detect - replace instrument</p>

	(q) Name of individual recording geophysical instrument source test results by instrument manufacturer with: type, model, serial number, by the date of daily equipment check. Record results for pass/fail source test with remarks. Reject and replace geophysical instrument that does not pass quality control source test.
14.0 SITE ACCESS	
<p>WARNING:</p> <p>UXO Technician(s) shall not make physical contact with MEC, or commercial explosives. UXO Technicians assigned to implement this SOP shall not intentionally move MEC or explosives, incendiaries, smokes, propellants, or commercial explosives.</p> <p>NOTE:</p> <p>If MEC, to include Unexploded Ordnance (UXO), Discarded Military Munitions, (DMM) or Material Potentially Presenting an Explosive Hazard (MPPEH) are encountered, the UXO Technician shall respond IAW 3R training, avoid such items, and notify Project Manager IAW site-specific project instructions.</p>	<p>(o) Implement 3R (R, R, R) process, and procedures.</p> <p>(o) Recognize MEC, UXO, DMM, and or MPPEH; offset mark anomaly location with flag, ribbon, paint, stakes, other location identifier</p> <p>(o) Retreat from MEC location and avoid MEC location</p> <p>(o) Report & record MEC location in logbook and contact Project Manager IAW project instructions to request additional guidance.</p> <p>Note:</p> <p>MR Safety may instruct UXO Qualified Technician to perform a zero contact Explosive Ordnance Reconnaissance of the item requesting information for type by function, condition, filler, and nomenclature (if visually possible), supported by photographs of the item.</p>
15.0 EXPLOSIVE ORDNANCE RECONNAISSANCE (EOR)	
EXPLOSIVE ORDNANCE RECONNAISSANCE	
Reconnaissance involving the investigation, detection, location, marking, initial identification, and reporting of suspected MPPEH in order to determine future action	
<p>EOR Method</p> <p>UXO Qualified Technician is required prior to performing an Explosive Ordnance Reconnaissance to review Department of the Army, Field Manual (FM) 21-16, Unexploded Ordnance (UXO) Procedures, August 1994 – A copy can be obtained from:</p>	<p>(o) Use general Explosive Ordnance Disposal (EOD) safety precautions until munition type, fuzing , condition, and filler are identified</p> <p>(o) Upon identification, of type by function, fuzing, and condition use general EOD safety precautions for the category of munition (e.g.</p>

<p>WWW.UXOINFO.COM or from CH2M HILL MR Operations, Kevin Lombardo/WDC</p>	<p>Rocket; avoid approach to the front and rear of item, etc).</p> <p>(s) Approach Unexploded Ordnance (UXO) 45° to the rear</p> <p>(s) Do not cast shadows over UXO fuze</p> <p>(s) Remain cognizant to avoid dispensed wires, filaments, or other items that could initiate movement</p> <p>(s) Remain cognizant of Electromagnetic Hazardous Radiation, to Ordnance (HERO) precautions.</p>
<p>Information Recovery</p>	<p>(o) Photograph item from each vantage point. Identify each photograph with item name, view (side, front, rear, etc.), and distance from camera to item, (f-stop & shutter speed and film speed if applicable). It is required that a photograph log be kept for each item. Use a ruler in photo to demonstrate perspective of the item.</p> <p>(o) Close-up photograph fuze, markings, nose, tail, and or markings</p>
<p>16.0 PERSONNEL ESCORT</p>	
<p>Personnel Escort</p> <p>A minimum of one UXO qualified Technician(II) shall escort non-UXO qualified site personnel conducting access to a Munitions Response Area or Site</p> <p>The UXO qualified person shall visually search the surface of walking paths, roads, and parking areas to locate, mark, and avoid MEC during walking, driving, or setting-up equipment.</p>	<p>(o) Establish a wind streamer of tape/ribbon (flag) within/near the project site to observe wind direction.</p> <p>(o) A UXO Technician shall visually search the surface area, for MEC/HTRW to avoid such items. The UXO Technician may augment the visual search with the application of a geophysical instrument to detect surface/subsurface ferrous and or non-ferrous anomaly sources for the purpose of anomaly avoidance</p> <p>(o/s) When escorting non-qualified UXO personnel, a UXO Technician shall lead, and non-UXO qualified personnel shall follow along a path identified by the UXO Technician.</p> <p>(o) The UXO Technician shall identify surface hazards (MPPEH) and avoid such hazards. The location of a hazard requires, the UXO Technician to communicate the location to non-UXO qualified persons for avoidance around the item.</p> <p>(s) Communication can be by hand signals (pointing), or marking with flags, tape, ribbon, paint, stakes, or other means identified during a safety briefing.</p>

	<p>(s) Essential Personnel Limits - MR Escorts are a minimum of one UXO qualified Technician II or above, to no more than six (6) non-qualified persons.</p> <p>(s) Non UXO qualified personnel shall not approach and avoid a marked MPPEH or HTRW hazard.</p>
<p align="center">17.0 MEC AVOIDANCE SUPPORT</p> <p align="center">LAND SURVEY, SEDIMENT SAMPLING, GROUNDWATER COLLECTION, ENDANGERED SPECIES SAMPLING/MONITORING</p>	
<p align="center">Applicable to Visitors, Land Survey, Sediment Sampling, Groundwater Collection, Endangered Species Sampling/Monitoring</p>	
<p>WARNING:</p> <p>Subsurface intrusive acts could initiate MEC, through physical contact, movement, or shock.</p>	<p>(o) A UXO Technician shall search each intrusive point from the surface with a magnetometer and or all metals detector in accordance with the instruments manufactures instructions, to locate ferrous and/or non-ferrous subsurface anomalies. Location of such subsurface anomalies requires the placement of an offset marker (pin flag a minimum of 12-inches) to the north of the greatest signal strength for the anomaly.</p> <p>(s) For land survey and sampling activities where detection of an anomaly occurs, an alternative location free of ferrous and non-ferrous anomalies is required to proceed with intrusive activities.</p> <p>(q) The UXO Technician shall note within the daily logbook the rejection of the primary location and selection of the alternative location, with a written description of direction and feet/inches for the offset location from the primary point.</p>
<p>NOTE:</p> <p>Personnel performing subsurface intrusive activities for the purpose of land survey and environmental sampling require a UXO Technician to search the subsurface with either or both (dependent on MEC site-specific history) a magnetometer and/or all metals detector to confirm the subsurface is free of ferrous and or non-ferrous anomalies.</p> <p>A UXO Technician shall mark the boundaries /limits for ingress/egress access from a safe area (i.e.: road) to the work activity location or provide escort to and from the work activity location.</p>	
<p align="center">18.0 VEGETATION REDUCTION MEC AVOIDANCE (MANUAL/MECHANICAL)</p>	
<p>WARNING:</p> <p>DO not apply vegetation cutting</p>	<p>(o) A UXO Technician shall escort vegetation reduction personnel, perform a visual and/or magnetometer and/or all metals detection instrument search of surface</p>

<p>closer than six-inches to ground surface.</p> <p>Vegetation reduction actions that occur less than six-inches above ground surface, may result in movement, or shock to MEC, resulting in an unintentional detonation or functioning as designed of the item.</p>	<p>access routes, walking paths, and vegetation reduction locations for MEC/HTRW and or obstruction hazards.</p> <p>(o) The UXO Technician shall operate a magnetometer and or all metals detection instrument to locate surface anomalies with potential to be a hazard to vegetation reduction crews.</p> <p>(o) The UXO Technician shall perform a visual surveillance of the surface to locate surface hazards (MEC, HTRW) or obstructions to equipment, mark the location and instruct vegetation reduction crews to avoid the location.</p> <p>(s) The UXO Technician shall remain away from the immediate operating radius of powered equipment and remain alert for flying debris</p> <p>(s) The UXO Technician shall wear high visibility outerwear, use hearing, and eye protection, and avoid swing radius of powered equipment.</p>
<p>Warning :</p> <p>Personnel performing vegetation reduction activities shall not operate equipment closer than 6-inches to the ground thus, all brush cutting equipment (chain saws, weed whackers, string trimmers, brush cutters, bush hogs, hydro-ax, or debarking equipment) shall operate six-inches or greater above ground.</p>	
<p style="text-align: center;">19.0 MEC AVOIDANCE (DOWN HOLE)</p>	
<p>WARNING:</p> <p>When applying MEC avoidance procedures for drilling or the use of direct push technology, the steel mass of drill rigs and direct push technology DPT power plants will influence gradiometers, and magnetometer reporting instruments. Thus, drill rigs and DPT equipment shall be withdrawn a minimum of ten feet from intrusive points while performing down-hole avoidance search.</p>	<p>(o) Prior to drilling, the UXO Technician will conduct a visual reconnaissance of access paths and drilling area. The reconnaissance will include locating the designated sampling or drilling location(s) ensuring that the locations do not have surface MEC, or MPPEH, and magnetometers or all metal detection search do not indicate the presence of subsurface anomalies. If detection of subsurface anomalies occurs, at the sampling point, the sampling point is abandoned. Once the designated sampling point has been determined free of anomalies, an access route for the sampling crew's vehicles is searched. The access path requires twice the width of the widest vehicle and marking along the sides with flags, ribbon, engineer tape, stakes, or equivalent to define limits.</p> <p>(s) If an observation of MEC or MPPEH should occur, the UXO Technician shall mark the item, avoid it, and notify the PM for either military EOD or UXO Contractor</p>

	<p>support.</p> <p>(o) A UXO Technician will clear each work site for drilling/DPT and clearly mark the safe to walk, and drill or DPT, boundaries. Each drill/DPT safe area will be large enough to accommodate the drilling equipment and provide a work area for the crews. As a minimum, the safe area will be a rectangle, with a side dimension equal to twice the length of the largest vehicle or piece of equipment for use on site.</p>
<p>NOTE:</p> <p>(p) Drilling and application of DPT may require an ingress route and pad turning radius, twice the width, and length of the mechanical equipment.</p>	
<p>NOTE:</p> <p>MEC may exist within the subsurface up to 30 feet below ground surface, dependent on site-specific history. Refer to project instruction to determine maximum depth for down-hole MEC avoidance support.</p>	
<p>The UXO Technician is required to escort personnel and remain with personnel when sampling/drilling at an MRP or MEC/MPPEH suspect site.</p>	<p>(o) Soil bore holing may be by hand auger, power-auger, drilling, DPT. A UXO Technician will examine, prior to sampling/drilling, the borehole location with a down-hole gradiometer or magnetometer, a minimum of every one (1) foot, to the deepest sampling depth or a maximum of 30 feet below ground surface to ensure avoidance of anomalies, or to depth identified within the project instruction.</p>
<p>WARNING:</p> <p>Drilling equipment may produce injury from snapping cables, pinch points, chain failures or falling booms, derricks, and drill piping. Avoid the immediate operational radius of drillers when supporting efforts.</p>	<p>(o) Drilling down-hole monitoring requires at a minimum of one (1) foot increments of search, during the actual well drilling operation. This will require the withdrawal of the drill rod or augers from the hole and moving the drill rig a minimum of 10 feet or enough feet away from the drill-hole location to prevent the metal in the rig from influencing the magnetometer/gradiometer.</p> <p>(o) The UXO Technician shall perform down-hole monitoring for anomalies at each location identified within the project instruction.</p>
20.0 QUALITY CONTROL	

The QC Manager will be responsible for ensuring this SOP is effectively implemented. Surveillances and/or inspections will be conducted to ensure SOP compliance.	(q) UXOQC personnel shall document nonconforming materials, items or activities in a NCR based on surveillances and/or inspections
21.0 ACTIVITY COMPLETION	
Completion of documentation:	<input type="checkbox"/> Project site logs to Project Manager <input type="checkbox"/> Tail gate safety meeting log to Project Manager <input type="checkbox"/> Equipment check-out report to Project Manager <input type="checkbox"/> Quality control reports to Project Manager
21.0 EQUIPMENT	
ITEM	QUANTITY
Cellular telephone	1
Dow-hole (only) Magnetometer/Gradiometer capable of down-hole operations to 30 feet	1 or (as required by Project instruction)
Magnetometer capable of monitoring to a depth of two-feet below ground surface for ferrous items	1 or (as required by Project instruction)
All metals detector capable of monitoring to a depth of 6-inches below ground surface for non-ferrous items	Optional
Multi colors of marking flags, ribbon, and tape	As determined by SUXOS
Batteries	Two day supply for instruments
First -aid Kit (25 person)	1 within the work area
Water	Minimum 1 liter per person in work area
Camera/Tape Measure/Ruler/Calipers/Paper Pencil	As determined by SUXOS
Hand tools, (hammer, general purpose tools, etc.)	Assorted as determined by SUXOS
MINIMUM PERSONAL PROTECTIVE EQUIPMENT: IAW with Safety Plan and AHA or a minimum of OSHA LEVEL "D"	
Coveralls (or long pants, sleeved shirt)	

Boots (level “D”)

Cover (cap, floppy, skull)

Gloves (leather)

Safety Eye protection (as required by AHA)

Hard hats (when working in an area with a potential for head injury or heavy equipment e.g. drill rig)

Because this is a possible HTRW operation, the MR Supervisor will direct the required explosive safety site PPE conditions.


SPECIAL TRAINING AND REFRESHER REQUIREMENTS:

UXO Technicians will be qualified at a minimum Level II designation and be graduates of the U.S. Naval School of Explosive Ordnance Disposal or other DOD DEDSB TP 18 approved course or school/course of instruction, Hazard Waste Operations IAW 29CFR 1910.120 (e) & (f) and medical clearance physical authorization to perform work.

WAIVERS, EXEMPTIONS, SPECIFIC AUTHORIZATIONS, OR APPROVED DEVIATIONS THAT APPLY TO THIS OPERATION: None

ACTIVITY HAZARD ANALYSIS

Safe Work Method Statement/ Job Hazard Analysis

Company Name: CH2M HILL	Project Name/#: SOP MRP 0001- MEC Anomaly Avoidance	
Work Activity/Task: MEC Anomaly Avoidance	Principal Contractor: CH2M HILL	
Date: December 09, 2009	Note: Sign off to be provided at Tool Box talk	
Prepared by: George DeMetropolis	Supervisor: TBD by project location	
Signature: 	Safety Coordinator (SC): TBD by project location	
<p>All metals detection equipment, metal detection instruments, magnetometry equipment, gradiometers, and military ordnance detection equipment, plant & equipment required: - machinery: maintenance checks provided and recorded by subcontractor or operator: suitably qualified and competent, with health, safety, and environment (HS&E) training</p> <p>Training Requirements 29 CFR 1910.120 (e) & (f); DDESB TP 18 minimum qualifications for Unexploded Ordnance Technicians; OPNAVINST 8020.14/MCO P8020.11 (series) and are certified to perform the job assigned and certification is current. NAVSEA OP5, paragraph 2-3 involving ammunition and explosives shall comply with NAVMED P117 Article 15-107. Prior to site operations, CH2M HILL will verify training, medical qualification statements by physicians, and conformance to substance abuse testing and reporting programs. CH2M HILL has an active explosive certification program and monitors these personnel for conformance to the Bureau of Alcohol, Tobacco, Firearms, and Explosives, Safe Explosives Act 2003 Certification requirements for "Employee Possessor," and or "Responsible Person." 3R training for non-UXO qualified Personnel.</p> <p>(in addition to those in project's written safety plan: - OHS Construction Induction - Waste Management for waste streams and materials</p>		
Job Step	Potential Hazard	Controls
Forms/Permits	Unknown client-specific hazards. MEC Surface/Subsurface	UXO qualified personnel, SOP MR 0001, 3Rs Training for Non-UXO qualified personnel, Metal (ferrous/nonferrous) detection equipment, DA EP 75-1-2. Well driller license, drill rig permit •Well installation or abandonment notification •Dig/drill permit obtained, where required by client facility •Water withdrawal permit obtained, where required
Site Setup	Striking underground utilities, impact with MEC	•Location of underground utilities and installations identified •Daily briefing Avoid Surface and Subsurface MEC through the use of MR SOP 0001 – MEC Anomaly Avoidance
	Striking overhead utilities	•Locate and take appropriate precautions with required distances from power lines •Lower mast and secure during travel

	Physical environmental hazards	<ul style="list-style-type: none"> •Use of appropriate personal protective equipment (PPE) where required. Safety boots, hard hats, safety glasses and hearing protection are mandatory. Respirators when chemical hazards exist. No loose-fitting clothing, rings, watches, etc.; long hair to be restrained close to the head.
	Dermal or inhalation exposure to contaminants	<ul style="list-style-type: none"> •Investigate history of area; determine nature and degree of contaminants that could be present •Conduct air monitoring for potential hazardous atmospheres as described in the project's written safety plan. •Use respirators and other PPE as prescribed in the project's written safety plan

Job Step	Potential Hazard	Controls
Site Setup (Continued)	Fire /Explosion	<ul style="list-style-type: none"> • No smoking around the drill rig – MR SOP-0001 MEC Anomaly Avoidance
	Struck by vehicles	<ul style="list-style-type: none"> •Follow traffic control plan •Wear high-visibility warning vests
	Drill rig travel	<ul style="list-style-type: none"> •Ensure stable ground and adequate footing for machinery. Adequate ground preparation to support loads and accommodate waste materials. •Drill rig travel will be conducted with mast secured in its lowered position •Tools and equipment secured prior to rig movement •Only personnel seated in cab are to ride on the rig vehicle •Ensure clearance of overhead power lines •Use alarm or spotter when reversing rig
	Illegal offsite impacts	<ul style="list-style-type: none"> • Excavation area checked for wetlands, endangered species, cultural/historic resources
	Spread of contamination from contaminated drill cuttings	<ul style="list-style-type: none"> •Manage cuttings in accordance with all project plans

Drilling Activities	Rotating machinery parts of drill rig MEC- surface/Subsurface – physical contact	<ul style="list-style-type: none"> •Daily inspection of drill rig & equipment •Ensure appropriate guards are installed or suitable barriers to forewarn personnel of dangers •Personnel clear during set up, clear of rotating parts •Loose clothing, long hair, and jewelry to be safely secured •Hands or feet should not be used to move cuttings away from auger •Rig in neutral and augers stopped rotating before cleaning •Kill switch installed, clearly identified and operational •Rig placed in neutral when operator not at controls •Pressurized lines and hoses secured from whipping hazards <p>Advance Drill/bore hole/DPT in one foot increments applying MR SOP 0001-MEC Anomaly Avoidance Procedures</p>
	Hoisting operations	<ul style="list-style-type: none"> •Ensure all personnel are clear of operation to a suitable safe distance
	Overturning of drill rig	<ul style="list-style-type: none"> •Establish drill pad if necessary •Drill rig level and stabilized
	Securing ropes and cables	<ul style="list-style-type: none"> •Ensure security to stable fixture. Do not wrap around any part of the body. •Drill rig ropes in clean, sound condition

22.0 PROCESS SUPERVISOR'S STATEMENT

I have read and understand this SOP. To the best of my knowledge, the processes described within this SOP can be done in a safe, healthful, and environmentally sound manner. I have made sure that all persons assigned to this process are qualified, have read and understand the requirements of this SOP, and have signed the workers statement for this process. I will ensure the SOP is the most recent revision. If a major change to the SOP is necessary, I will ensure that the processes are stopped until the SOP is revised and approved. If unexpected safety, health, or environmental hazards arise, I will stop activities, until hazards have been controlled, reduced, or eliminated to an acceptable risk level.

SOP MRP 0001 PROCEDURE SUPERVISOR ACKNOWLEDGEMENT

UXO Supervisor's Name (print):	Supervisor's Signature	Organization	Date

23.0 PERSONNEL STATEMENT

I have read this SOP and I have received adequate demonstration of the procedure, training to perform the process and procedure according to requirements, procedure, and guidance identified below. I agree to follow this SOP, unless I identify a hazard, work condition, or compliance issue not addressed within this SOP or encounter a situation, condition, or issue that, I cannot perform according to the SOP. If such a stoppage occurs, I will immediately notify the SUXOS, UXO Technician III, or II. Should the situation, condition, or compliance remain unresolved for greater than 24-hours, I shall contact the Munitions Response Safety Manager (619) 564-9627.

SOP MRP - 0001 - PERSONNEL STATEMENT ACKNOWLEDGEMENT

Personnel Name (print):	Personnel Signature	Organization	Date

Reacquisition of Targets Prior to Intrusive Investigations

1 Purpose

The purpose of this SOP is to identify the means and methods to be employed when reacquiring target locations prior to intrusive investigations. This SOP specifically addresses targets derived from analysis of cued interrogation data collected using advanced electromagnetic induction (EMI) sensors (e.g. TEMTADS 2x2).

2 Personnel, Equipment and Materials

This section describes the personnel, equipment and materials required to implement this SOP. The following is a list of required equipment and materials:

Personnel:

- Field geophysicists or other staff experienced in operation of a Real Time Kinematic (RTK) Global Positioning System (GPS)
- Professional Land Surveyor (PLS) and field support staff
- UXO personnel (1 UXO technician per reacquisition team)

Note: When reacquisition is required in areas where use of RTK GPS may not be reliable (e.g. wooded sites), reacquisition will be performed by a licensed PLS in good standing with the state where field work will be performed. When reacquisition can be performed using RTK GPS, CH2M HILL will perform reacquisition, unless otherwise noted in the project work planning documents.

Equipment and Materials:

- RTK GPS or Total Station, as appropriate
- Survey pole (bi-pole or monopole) with level bubbles in proper working condition
- List of targets to reacquire
- Non-metallic vinyl-stem flags
- Permanent marker (retractable Sharpie is optimal)
- Hip or waist tool belt to hold flags, pens, extra GPS batteries
- Tool to loosen hard ground (awl or screwdriver) if allowed by SUXOS (optional)

2.1 Personnel and Qualification

The following individuals will be involved in the reacquisition of targets prior to and during intrusive activities:

- Field Geophysicist(s) or other staff experienced in operation of RTK GPS will be responsible for uploading targets to RTK GPS data collector, operation and maintenance of field equipment, reacquisition of targets and placement of flags, and daily downloading and quality control (QC) checks.
- UXO Personnel will be responsible for overall daily site access and safety aspects of the project, compiling subcontractor health and safety documents (as appropriate), conducting daily safety briefings and performing subsurface anomaly avoidance during placement of flags or other activities that may involve ground disturbance.

- Professional Land Surveyor field staff will be responsible for operation of total station (or robotic total station) equipment, uploading targets to instrument data collector, operation and maintenance of field equipment, reacquisition of targets and placement of flags, and daily downloading and QC checks.
- Data Processing Geophysicist(s) will be responsible for providing target lists to the field team for reacquisition. The Data Processing Geophysicists will also be responsible for verification of the field efforts as well as performing additional QC checks on daily downloaded RTK GPS or total station instrument files.

3 Procedures and Guidelines

3.1 Target Reacquisition Prior to Intrusive Activities

The Data Processing Geophysicist will be responsible for delivery of current target lists (in Microsoft Comma Separated Variable [.CSV] format) to the reacquisition field team leader (CH2M HILL or PLS). These lists will be comprised of the actual target location (i.e. will not be offset by any safety factor) and will be provided in the project-specific projection, datum, and units.

The field team leader will open the supplied data file and compare the number of listed targets versus the quantity stipulated by the Data Processing Geophysicist. If a discrepancy is noted, the field team leader will resolve the discrepancy with the Data Processing Geophysicist prior to stakeout of targets.

The targets will be loaded into the instrument data collector. Targets will be loaded such that the Target ID provided in the supplied list is assigned to the recorded measurement at the time of flag placement.

The target location will be marked with paint and a flag will be placed at a predetermined distance north of the anomaly (this can be easily measured using a ruler or stick cut to the required offset distance). The field teams will write the Target ID legibly on the flag in marker. If a mistake is made during writing the IDs, a new flag will be used and the erroneous flag discarded (as opposed to crossing or scribbling out incorrect IDs).

The ‘as-staked’ location of the flag will be surveyed in and recorded for QC review. Once the ‘as-staked’ flag location is stored, the target will be removed from the active reacquisition list to avoid accidental navigation to the wrong target.

3.2 Recording Item Locations during Intrusive Activities

The reacquisition field team accompanies the dig teams and records the precise in-situ locations of the dig findings. Each recorded measurement shall have the full Target ID and a letter for each object uncovered per dig location. If multiple subsurface items are found at a dig location, each item will be recorded, and the Target IDs will be appended with a sequential letter, starting with “A.”

3.3 Subsurface Anomaly Avoidance

A UXO technician will be assigned to each reacquisition teams. UXO personnel will perform subsurface anomaly avoidance at each intended flag location using handheld analog geophysical instruments (which will undergo daily function checks).

If a subsurface anomaly prevents safe placement of the flag at the supplied target location (i.e. the offset location from the geophysical anomaly location), the field team leader will make note of the

condition, place the flag as close as safely possible to the supplied location, record the measurement, and annotate the finding in the daily field notes provided to the Data Processing Geophysicist. The Data Processing Geophysicist and field team leader will evaluate whether the “as-staked” location is sufficient for placement of the TEMTADS 2x2 during follow-up cued surveys or if a new offset distance and/or direction is warranted. In any case, the Data Processing Geophysicist and reacquisition field team leader will inform the TEMTADS 2x2 cued survey team of the deviation from the offset protocol established for the project in order to facilitate proper position and alignment of the TEMTADS 2x2 sensor during the cued interrogation survey.

4 Quality Control

4.1 Daily Instrument Position Accuracy Check

At the beginning of each day, the instrument used for reacquisition will undergo a field QC check for positional accuracy. A known, previously-established point (e.g. benchmark, control point) shall be loaded into the instrument data collector, and a daily measurement shall be performed at this point. The measured coordinates will be compared to the previously-established coordinates. The Measurement Quality Objective (MQO) is the measured coordinates are within 4 inches (10 centimeters) of the known coordinates.

4.2 Data Verification

After downloading and prior to submitting the instrument data collector files, the reacquisition field team leader will be responsible for comparing the number of recorded measurements to the daily field notes in order to check for completeness of the records. Discrepancies will be resolved by the field teams (CH2M HILL, PLS, UXO personnel) prior to submittal of the information to the Data Processing Geophysicist. Necessary adjustments to file names, Target IDs, or other information will be performed prior to submittal of the information to the Data Processing Geophysicist.

4.3 Comparison of Recorded Flag Locations to Supplied Target Coordinates

During reacquisition in advance of intrusive investigations, daily QC checks will be performed on the recorded flag locations by comparing the measured flag locations to the target locations supplied by the Data Processing Geophysicist. Below is an example of the comparison (note that the offset is accounted for in the calculation of the x and y errors):

TARGET_ID	FIT_X	FIT_Y	Safety Offset	Flag_X	Flag_Y	X err (m)	Y err (m)	Dist err (m)
1220038_001_01	704935.21	3914585.22	0.50	704935.31	3914585.73	0.10	0.01	0.10
1320065_001_04	704965.77	3914588.12	0.50	704965.82	3914588.61	0.05	-0.01	0.05
1420101_001_02	705012.23	3914584.66	0.50	705012.30	3914585.16	0.07	0.00	0.07

The MQO for this check is 4 inches (10 centimeters). If the difference between the measured flag location and supplied target is >4 inches (10 centimeters), the target will be reacquired in the field and resolve prior to conducting the intrusive investigation.

5 Reporting

Instrument data collector files will be downloaded daily and submitted by the reacquisition field team leader (CH2M HILL or PLS) to the Data Processing Geophysicist via the established communication pathways (email, Share Point, File Transfer Protocol). Information will not be submitted to the Data Processing Geophysicist until discrepancies in Target IDs, quantities, or other relevant information is resolved by the field teams. Daily field notes shall be provided with the data delivery package.

Appendix B

Accident Prevention Plan

Revision 1

Accident Prevention Plan UXO 20 Intrusive Investigation of DGM Anomalies

**Naval Station Facility Indian Head
Indian Head, Maryland**

Contract Task Order JU05

September 2015

Prepared for

**Department of the Navy
Naval Facilities Engineering Command
Washington**

Under the

**NAVFAC CLEAN 8012 Program
Contract N62470-11-D-8012**

Prepared by



Herndon, Virginia

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Attachment

A Site Safety and Health Plan

Acronyms and Abbreviations

AHA	activity hazard analysis
APP	Accident Prevention Plan
CFR	Code of Federal Regulations
CH2M	CH2M HILL, Inc.
CO/COR	Contracting Officer/Representative
CPR	cardiopulmonary resuscitation
DGM	digital geophysical mapping
EAP	Employee Assistance Program
EMR	Experience Modification Rate
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSM	Health and Safety Manager
IARC	International Agency for Research on Cancer
IIPP	Injury and Illness Prevention Program
MSDS	material safety data sheet
NSFIH	Naval Support Facility Indian Head
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
SSHO	Site Safety Health Officer
SSHP	Site Safety and Health Plan
USACE	U.S. Army Corps of Engineers

SECTION 1

Signature Page

Accident Prevention Plan (APP)

UXO 20 Intrusive Investigation of Anomalies

Naval Support Facility Indian Head (NSFIH)

Indian Head, Maryland

Date:

September 2015

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Date:
10/02/15

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Date: 10/5/15

SECTION 2

Background Information

This APP has been developed to protect and guide the personnel conducting oversight of digital geophysical mapping (DGM) and intrusive investigation of anomalies at UXO 20, NSFIH in Indian Head, Maryland. UXO 20 is a 1.6-acre site at the end of Old Burn Point Way on a peninsula that extends into the confluence of Mattawoman Creek and the Potomac River.

This APP has been prepared to meet applicable requirements of the U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual EM 385-1-1, 29 Code of Federal Regulations (CFR) 1910.1200 Hazard Communication Standard, Hazardous Waste Operations or Emergency Response as required by 29 CFR 1910.120 and 29 CFR 1926.65, and the corporate safety and health policies of CH2M HILL, Inc. (CH2M). This APP has been constructed to directly track with the EM 385-1-1 Attachment A “Minimum Basic Outline for Accident Prevention Plan.”

Various portions of this work shall also be conducted under nonhazardous waste site protocols. The site safety and health plan (SSHP) for this project is included as Attachment A.

2.1 Contractor

CH2M HILL, Inc.

2.2 Contract Number

N62470-11-D-8012

2.3 Project Name

UXO 20 (Safety Thermal Treatment Point), NSFIH

2.4 Project Description and Location

This APP presents the hazards known or anticipated to be present at UXO 20. UXO 20, Safety Thermal Treatment Point is a 1.6-acre site at the end of Old Burn Point Way on a peninsula that extends southwest from the Main Installation into the confluence of Mattawoman Creek and the Potomac River. It is a manmade peninsula constructed of sand, fill material, rocket motor casings, empty cartridges, and coal fly ash. Based on a conversation between CH2M and NSFIH personnel on August 2, 2011, the northern part of the peninsula is active and is being used by NSFIH to test hand grenades. Based on this information, the boundary of UXO 20 has been adjusted to include the southern part and spits of the peninsula, totaling approximately 0.97 acre. At present, the site or UXO 20 refers to the area in the southern part of the peninsula.

This APP also outlines the health and safety procedures that will be used to conduct oversight on DGM and intrusive investigations at this site. The oversight is expected to be performed in the summer of 2016. CH2M and its subcontractors will use this project-specific APP to identify and mitigate task-specific hazards and select appropriate health and safety protective measures.

Onsite personnel must review the APP and sign an agreement to comply with its provisions before commencing onsite work. The APP and attached SSHP are considered operational documents that are subject to revisions in response to various site-specific conditions that may be encountered. However, the documents may be modified or updated only with the approval of the health and safety manager (HSM) and project manager.

2.5 Contractor Accident Experience

CH2M's safety performance exceeds the industry average. Our injury and illness rates and our Experience Modification Rate (EMR) have averaged 0.67 over the past 5 years.

Following are examples of our achievements:

- An EMR of less than 1 over the past 5 years, which is the average accident injury experience for the industry, with a 2014 EMR of 0.64 (or 64 percent) of the industry average (NAICS 54133).

Category	2010	2011	2012	2013	2014
Employee Hours	12,842,086	10,704,063	9,759,106	9,636,525	10,081,283
Experience Modification Rate (EMR)	0.71	0.66	0.69	0.63	0.64
Fatalities	0	0	0	0	0
Recordable Incidents	9	13	12	13	9
Recordable Incident Rate	0.14	0.24	0.25	0.27	0.18
Recordable Incident Rate Average	1.0	1.0	0.8	0.7	0.7
Lost Workday (LWD) Incidents (DART)	1	3	0	2	1
LWD Incident Rate (DART)	0.02	0.06	0.0	0.04	0.02

2.6 Work Requiring Activity Hazard Analysis

The planned field tasks requiring activity hazard analyses (AHAs) are as follows:

- 01 General oversight
- 02 DGM (subcontractor)
- 03 Intrusive investigation of anomaly locations (subcontractor)
- 04 MEC/MPPEH disposal (subcontractor)

AHAs for each of the above field tasks are included in Attachment A.

Statement of Safety and Health Policy and Compliance Procedures

CH2M is committed to providing a safe and healthful workplace for employees. The conditions will be ensured through an aggressive and comprehensive worker safety and health program that is integrated with other site worker protection activities. CH2M regards employee protection as a priority and is committed to developing, implementing, and improving safety and health practices that will afford optimal protection to employees and enable continuous improvement of the quality of worker protection performance. The safety and health of employees will take precedence whenever conflicts with production or other objectives arise.

Managers and supervisors are held accountable for worker safety and health. Accountability is achieved by assigning worker protection responsibilities, evaluating personnel performance, and holding personnel accountable for worker protection performance.

In addition to complying with this APP and their corporate safety and health program, persons working under the SSHP are encouraged to be active participants in their workplace safety and health activities, and to actively take advantage of the worker rights in a responsible manner, without reprisal.

CH2M has embraced a philosophy for health safety and environment excellence. The primary driving force behind this commitment to health and safety is simple: employees are the company's most significant asset, and management values their safety, health, and welfare. Also, top management believes that all injuries are preventable. The safety culture empowers employees at all levels to accept ownership for safety and take whatever actions are necessary to eliminate injury. CH2M is committed to world-class performance in health and safety and understands that world-class performance in health and safety is a critical element in overall business success.

CH2M is committed to preventing personal injuries, occupational illnesses, and damage to equipment and property in all of its operations; protecting the general public whenever it comes in contact with the Company's work; and preventing pollution and environmental degradation.

Company management, field supervisors, and employees plan safety into each work task to prevent occupational injuries and illnesses. CH2M management extends its full commitment to health and safety excellence.

3.1 Objective

The objective of the CH2M program is to provide a place of employment free of recognized hazards that are causing or will likely result in death or serious physical harm to our employees. The objective can be facilitated by developing and administering an overall health and safety program, which establishes written policies and procedures to serve as vehicles through which the program requirements will be implemented.

3.2 Purpose

The purpose of this project APP, in conjunction with the project-specific or program health and safety documents, is to define the policies, procedures, and requirements that must be implemented for the CH2M program and to establish the requirements, responsibilities, and expectations for management, supervisors, employees, and subcontractors that may participate in the execution of the program projects. It is the intent of this APP to address applicable requirements set forth by 29 CFR 1910, 29 CFR 1926, EM 385 1-1, and CH2M policies and procedures incorporated by reference herein.

3.3 Goals

The health and safety goal for this project and the overall goal for the CH2M program are to eliminate workplace accidents, gain worker acceptance through cooperation and training, and provide our clients with a responsible, well-trained, safety-oriented work force.

CH2M considers safety the highest priority during work at all project sites and in its business offices, and has established a goal of zero incidents. CH2M's program will be conducted in a manner that minimizes the probability of near misses, injury, illness, and equipment or property damage.

All management and employees are to strive to meet the project-specific health, safety, and environment goals outlined below. The team will be successful only if everyone makes a concerted effort to accomplish these goals. The goals allow the project to stay focused on optimizing the health and safety of all project personnel and, therefore, making the project a great success.

The project has established the following 11 specific goals and objectives:

1. Create an injury-free environment.
2. Have zero injuries or incidents.
3. Provide management leadership for health, safety, and environment by communicating performance expectations, reviewing and tracking performance, and leading by example.
4. Ensure effective implementation of the SSHP and APP through education, delegation, and teamwork.
5. Ensure 100-percent participation in training programs, personal protective equipment (PPE) use, and health, safety, and environment compliance.
6. Continuously improve safety performance.
7. Maintain free and open lines of communication.
8. Make a personal commitment to safety as a value.
9. Focus safety improvements on high-risk groups.
10. Continue strong employee involvement initiatives.
11. Achieve health and safety excellence.

3.4 Safe Work Policy

It is policy to perform work in the safest manner possible. Safety must never be compromised. To fulfill the requirements of this policy, an organized and effective safety program must be carried out at each location where work is performed.

CH2M believes that all injuries are preventable, and is dedicated to the goal of a safe work environment. To achieve this goal, every employee on the project must assume responsibility for safety.

Every employee is empowered to:

- Conduct their work in a safe manner
- Stop work immediately to correct any unsafe condition that is encountered
- Take corrective actions so that work may proceed in a safe manner

Safety, occupational health, and environmental protection will not be sacrificed for production.

3.5 Standards of Conduct Violations

All individuals associated with this project must work injury-free and drug-free and must comply with the Standards of Conduct, the SSHP and APP, and the site safety requirements. Commonly accepted standards of conduct help maintain good relationships between people. They promote responsibility and self-

development. Misunderstandings, frictions, and disciplinary action can be avoided by refraining from thoughtless or wrongful acts. Violations of the standards of conduct would include, but not be limited to the following:

- Failure to perform work
- Inefficient performance, incompetence, or neglect of work
- Willful refusal to perform work as directed (insubordination)
- Negligence in observing safety regulations, poor housekeeping, or failure to report on-the-job injuries or unsafe conditions
- Unexcused or excessive absence or tardiness
- Unwillingness or inability to work in harmony with others
- Discourtesy, irritation, friction, or other conduct that creates disharmony
- Harassment or discrimination against another individual
- Failure to be prepared for work by wearing the appropriate construction clothing or PPE, or bringing the necessary tools
- Violation of any other commonly accepted reasonable rule of responsible personal conduct
- Violation of the safety and health requirements of their corporation's policy or of this APP
- Unauthorized or illegal possession, use, or sale of alcohol or controlled substances on work premises, during working hours, while engaged in corporate activities, or in corporate vehicles
- Use or sale of firearms or explosives on work premises

See Attachment A of the SSHP, Section 1, for further details.

3.6 Intolerable Offenses

Certain employee conduct may be so intolerable as to justify removal from the project. Intolerable offenses and actions will include, but not be limited to, the following:

- Any manager, supervisor, foreman, or other person in charge of the work being performed who requires requests, asks, threatens with their job, allows, or condones employees to work in or around unsafe acts or conditions
- Any employee, supervisor, or manager who knowingly falsifies any investigative documents or testimony involving an investigation
- Any employee, supervisor, or manager who openly exhibits disregard, defiance, or disrespect for the safety program
- Any employee who violates established safety rules, regulations, or codes that endanger themselves or other employees
- Any and all parties involved in workplace violence, including physical encounters (fighting) or threats of violence, theft, or destruction of property
- Any employee, supervisor, or manager failing to comply with procedures contained in the subcontract, SSHP and APP, USACE EM 385-1-1 Manual, or local safety laws and regulations that create the potential for serious or costly consequences
- Any employee who commits repeated minor offenses and shows a lack of responsible effort to correct these offenses

3.7 Enforcement and Discipline

CH2M's Enforcement and Discipline procedures, the Standards of Conduct, the Intolerable Offenses, and the Drug-Free Workplace policy will be thoroughly reviewed with each employee during the employee project orientation.

3.7.1 Intolerable Offenses

CH2M practices zero tolerance for intolerable offenses. Individuals found participating in such offenses will be dealt with according to our policy and may be subjected to the following:

- Suspended from work for 3 days without pay
- Immediately discharged and not allowed to return

3.7.2 Other Violations

Other violations will be handled accordingly:

- First offense—employee will receive a written warning
- Second offense—employee will receive a 2-day suspension without pay
- Third offense—employee will be discharged

3.8 Subcontractor Default

If the subcontractor fails to comply with any of the requirements of the subcontract, SSHP and APP, or local safety laws and regulations, the prime contractor may issue a stop work order to the subcontractor. Thereupon, the subcontractor will immediately cease all work or portion of work that may be specifically designated in the stop work order until the prime contractor has concluded in writing that the subcontractor has corrected its failure of performance. No adjustments will be made to the subcontractor price or schedule as a result of any stop work orders being issued by the prime contractor. A stop work order will be given to the noncompliant subcontractor on the date of deficiency. If the subcontractor fails to correct the deficiencies noted in the stop work order within 3 working days following the written notice from the prime contractor, the prime contractor may, without prejudice to any other rights or remedies under the subcontract or at law or equity, suspend all further payments to subcontractor and/or terminate subcontractor's right to continue performance of the work.

3.9 Incentive Program

CH2M will encourage all parties to implement a safety incentive program for the project that rewards workers for exhibiting exemplary safety behaviors. Actions that qualify are those that go above and beyond what is expected. Actions that will be rewarded include spotting and correcting a hazard, bringing a hazard to the attention of your foreman, telling your foreman about an incident, coming up with a safer way to get the work done, stopping a crew member from doing something unsafe, etc. The program will operate throughout the project, covering all craft workers. The incentive program will be communicated to all employees during the project employee orientation and project safety meetings.

3.10 Posting of Health and Safety Information

There will be a posting area, accessible by all workers onsite, and in clear view for the posting of site-specific health and safety information. The posted information will be protected from the environment and kept updated as project information changes.

Responsibilities and Lines of Authorities

This section identifies the personnel who have specific safety responsibilities on the project.

4.1 Personnel with Safety Responsibilities

Participating personnel are responsible for complying with safety procedures and for proactively making safety awareness part of their day-to-day conduct.

The following positions have specific corporate and project safety responsibilities:

- HSM
- Project manager
- Site safety health officer (SSHO)
- Other project field staff

Attachment A (SSHP) lists the specific personnel that will fill the stated positions for this project. See Section 4 of Attachment A for details and lines of authority.

All work is conducted under a behavior-based and loss prevention system program. AHAs are a vital part of this work, as well as using Pre-task Safety Planning. All staff members are accountable for their own health and safety, and have the authority to request a work stoppage when they feel unsafe behaviors, actions, or situations are occurring.

All work requiring a competent person per the Occupational Safety and Health Administration (OSHA) definition (29 CFR 1926.32(f)), will not be started until that competent person is designated and on site. *Competent person* means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

For all general tasks, the SSHO is the competent person, unless otherwise noted for specific tasks.

SECTION 5

Subcontractors and Suppliers

Subcontractors and suppliers providing services onsite will be subject to the safety provisions of this APP and those included in Attachment A. See Section 4.3 of Attachment A for details. At this time, there is one subcontractor planned for use to fulfill this task order.

CH2M and any identified subcontractors shall conduct site work in accordance with this APP and associated documents. CH2M shall address compliance with specific safety and health requirements, including those listed in Section 9, and through safety meetings at the start of each shift. The specific safety and health requirements and site conditions will be reviewed with field personnel during the meetings. All parties shall also comply with the requirements of their respective Injury and Illness Prevention Programs (IIPPs).

SECTION 6

Training

Site workers, supervisors, and managers will have training appropriate to their assigned duties and as specified in the SSHP and AHAs that are applicable to the work being performed. As specified in Section 4 of Attachment A, the SSHO (who will also conduct the project safety and health inspections), will meet the training and indoctrination requirements prescribed in this APP and Attachment A, as well as the Hazardous Waste Operations and Emergency Response (HAZWOPER) supervisory training. All employees engaging in hazardous waste operations or emergency response shall receive appropriate training as required by 29 CFR 1910.120 and 29 CFR 1926.65. At a minimum, the training shall have consisted of instruction in the topics outlined in 29 CFR 1910.120 and 29 CFR 1926.65. Since there are no tasks planned that require a competent person, competent-person-level training is not required. Personnel who have not met these training requirements shall not be allowed to engage in HAZWOPER activities.

Details of required training are specified in Section 15 of Attachment A.

All SSHO's (primary and alternates) will have completed 30-hour OSHA Construction Safety training, as well as all required internal training courses under CH2M requirements. The courses include, but are limited to, first-aid/cardiopulmonary resuscitation (CPR), fire extinguisher, bloodborne pathogens, and many others.

The SSHO shall also serve as the project competent person for all general tasks not covered by a specialized subcontractor.

Safety and Health Inspections

7.1 Inspection Details

The project SSHO (specifically identified in the attached SSHP) will provide onsite safety and health inspections for this project. The SSHO will meet the training and indoctrination requirements as prescribed in this APP and Attachment A, including HAZWOPER supervisory training, CPR, first-aid, and bloodborne pathogen awareness training. The SSHO will also have hands-on experience overseeing these types of tasks.

See Section 21 of Attachment A for further inspection details.

7.2 Recordkeeping

Project safety and health documentation will be maintained by the SSHO for CH2M staff and verified for the respective contractors assigned to this task order. Records to be maintained (both in project files of each of the respective companies, and in the onsite field trailer) will include the following:

- HAZWOPER training certificates
- First-aid and CPR training certificates
- Documentation of medical surveillance
- Daily safety and health briefing acknowledgment forms
- Deficiency identification, correction, and follow-up documentation
- Accident reports and investigation records
- Respirator usage and fit training, as applicable
- Material safety data sheet (MSDS) for sample preservatives

7.3 External Inspection/Certifications

External inspections or certifications will not be required for this work.

SECTION 8

Accident Reporting

The SSHO and HSM are responsible for all incidents reporting. Specific details are in Section 22 of Attachment A.

Also, all significant accidents shall be reported as soon as possible, but not more than 24 hours afterwards to the Contracting Officer/Representative (CO/COR). The contractor shall thoroughly investigate the incident and submit the findings of the investigation along with appropriate corrective actions to the CO/COR in the prescribed format as soon as possible, but no later than 5 working days following the incident. Implement corrective actions as soon as reasonably possible.

The following occurrences require immediate accident notification:

- A fatal injury
- A permanent total disability
- A permanent partial disability
- The hospitalization of three or more people resulting from a single occurrence
- Property damage of \$200,000 or more

Plans Required By the EM 385-1-1 Safety Manual

Plans required by the EM 385-1-1 Safety Manual are presented in the following subsections. Plans and procedures that are not applicable to this project are indicated as such with the non-applicability rationale.

9.1 Layout Plan

The site layout is located at the end of Section 3 in the SSHP. It will be provided to staff before starting work.

9.2 Emergency Response Plans

Details are provided in Sections 19 and 20 of Attachment A. Medical support for this project will be provided onsite and offsite. The plans fulfill the following:

- Procedures and tests (01.E.01)
- Spill plans (01.E.01, 06.A.02)
- Firefighting plan (01.E.01, Section 9)
- Posting of emergency telephone numbers (01.E.05)
- Man overboard/abandon ship (19.A.04)
- Medical support (03.A.02: 03.D)

9.2.1 Onsite Medical Support

When two or more field staff members are present onsite, at least two members will have current certification in basic first-aid and CPR, along with bloodborne pathogens annual training. Unless injured, the SSHO will be the lead person to initiate any required first-aid until offsite medical support can be engaged.

Location and direction to medical support facilities shall be posted in a conspicuous location where temporary construction facilities or support are established at the project site. Where temporary construction facilities or a designated administrative/support office are not allowed or provided, the list shall be available for quick reference by the SSHO personnel executing site operations and its location shall also be made known to other site personnel.

In addition, the project shall be outfitted with first-aid kits of suitable size and quality (contents) to meet health and safety requirements for onsite first-aid and CPR response. Personal protective devices shall be provided such that universal precautions against bloodborne pathogens can be exercised while administering CPR or first-aid. Eye wash stations, either portable or stationary, will be available.

An effective means of communication to summon transportation of injured workers to medical treatment facilities must be evaluated and established before starting field activities. Communication devices shall be tested in the area of use to assure functionality. When a medical facility or physician is not accessible within 5 minutes of an injury to a group of two or more employees for the treatment of injuries, at least two employees on each shift shall be qualified/certified to administer basic first-aid and CPR, along with bloodborne pathogens annual training. Unless injured, the SSHO/site safety coordinator will be the lead person to initiate any required first-aid until offsite medical support can be engaged.

It must be understood that for life-threatening emergencies, get or summon medical attention immediately.

During non-life-threatening emergencies, follow these procedures as appropriate:

- Notify appropriate emergency response authorities (for example, 911).
- The site supervisor or site safety coordinator will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.

- Prevent further injury.
- Initiate first-aid and CPR where feasible and where worker “Universal Precautions” to bloodborne pathogens can be completed.
- Perform decontamination where feasible; lifesaving and first-aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- When contacting the medical consultant, give your name and telephone number, the name of the injured person, the extent of the injury or exposure, and the name and location of the medical facility where the injured person was taken.

9.2.2 Offsite Medical Support

In the event of a medical emergency or if follow up to basic first-aid is required, request emergency medical transport as opposed to transporting the injured person in a private or company vehicle where practical. The contact and location information for the nearest offsite medical support is presented below. A map indicating the travel route to the nearest medical facility with emergency care is presented in the SSHP.

Medical facility:

Civista Medical Center

701 East Charles Street, La Plata, MD

Emergency #: In case of emergency contact the base police, fire, and medical emergency dispatch at (301) 744-4333.

9.2.3 Hospital Addresses and Route

Information on the nearest medical facility with emergency care is discussed in Section 19 of the SSHP.

9.3 Alcohol and Drug Abuse Prevention

(References: DFARS, Subpart 252.223-7004 and CH2M HILL SOP HSE-105, *Drug Free Workplace Program*)

In order to maintain a drug- and alcohol-free workplace, the respective parties have established a drug- and alcohol-free awareness program to educate employees on the following: (1) the danger of drug abuse and alcohol in the workplace; (2) the corporate drug- and alcohol-free workplace policy; (3) the availability of any drug and alcohol counseling, rehabilitation, and employee assistance programs; and (4) the penalties that may be imposed upon employees for drug abuse and alcohol violations and violations of the corporation’s drug- and alcohol-free workplace. Such education includes the distribution of the drug- and alcohol-free workplace policy at the employment interview; a discussion of the drug- and alcohol-free workplace policy at the new employee orientation session; and inclusion of the company’s drug- and alcohol-free workplace policy in the employee handbook and any other personnel policy publications.

9.3.1 CH2M HILL

CH2M has vital interests in ensuring a safe, healthy, and efficient working environment for our employees, their coworkers, and clients we serve. The unlawful or improper use of controlled substances or alcohol in the workplace presents a danger to everyone. In addition, as a federal contractor, we have a duty to comply with the requirement of the Drug-Free Workplace Act of 1988. For these reasons, CH2M has established as a condition of employment and continued employment with the corporation the following drug- and alcohol-free workplace policy.

Employees are prohibited from reporting to work or working while using illegal or unauthorized substances. Employees are prohibited from reporting to work or working when the employee uses any drugs, except when the use is pursuant to a doctor’s orders and the doctor has advised the employee that the substance does not adversely affect the employee’s ability to safely perform his or her job duties. This does not include the authorized use of alcohol at corporate-sponsored functions or activities.

In addition, employees are prohibited from engaging in the unlawful or unauthorized manufacture, distribution, sale, or possession of illegal or unauthorized substances and alcohol in the workplace, including on client-paid time, on client premises, in client vehicles, or while engaged in client activities.

In accordance with the Drug-Free Workplace Act of 1988, employees must notify their supervisor of any criminal drug statute conviction for a violation occurring within the workplace within 5 days of such conviction.

Employment with the corporation is conditioned upon an employee's full compliance with the foregoing drug- and alcohol-free workplace policy. Any violation of this policy may result in disciplinary action, up to and including discharge. Furthermore, any employee who violates this policy who is subject to termination may be permitted in lieu of termination, at the corporation's sole discretion, to participate in and successfully complete an appropriate treatment, counseling, or rehabilitation program as recommended by a substance abuse professional as a condition of continued employment and in accordance with applicable federal, state, and local laws.

Consistent with its fair employment policy, the corporation maintains a policy of nondiscrimination and reasonable accommodation with respect to recovering addicts and alcoholics, and those having a medical history reflecting treatment for substance abuse conditions. CH2M encourages employees to seek assistance before their drug and alcohol use renders them unable to perform their essential job functions or jeopardizes the health and safety of themselves or others. The corporation will attempt to assist its employees through referrals to rehabilitation, appropriate leaves of absence, and other measures consistent with the corporation's policies and applicable federal, state, or local laws.

The corporation further reserves the right to take any and all appropriate and lawful actions necessary to enforce this drug- and alcohol-free workplace policy, including, but not limited to, the inspection of corporation-issued lockers, desks, or other suspected areas of concealment. Employees are required to submit for "post-accident" and "for cause" drug and alcohol screening following any incident. Random drug and/or alcohol screening is a requirement of CH2M.

9.3.2 Subcontractor Management

The subcontractor must comply with the provisions of this program. As a minimum, the subcontractor must provide a written statement that their drug-free workplace program meets the minimum requirements outlined in CH2M's program.

The prime contractor project manager and site safety coordinator can request to be provided copies of any subcontractor's employee's last negative screening results. The results cannot be over 12 months old.

It is the responsibility of subcontractors to transfer this plan to the lower-tiered subcontractors.

9.3.3 Prescription and Nonprescription Drugs

Employees using prescription or nonprescription drugs that could impair their functions on the project are required to notify the employer in advance of such drug use.

Failure to report prescription and nonprescription drugs as required above, illegally obtaining the substance, or use that is inconsistent with the prescription or label may be subject to disciplinary action.

The subcontractor is required to document that all of their employees have also been provided with a drug-free workplace and alcohol education program.

9.3.4 Employee Assistance Program

Employees may participate in CH2M's Employee Assistance Program (EAP) immediately upon hire. The EAP helps eligible employees and their immediate families with a wide range of problems, including marriage and family problems, emotional problems, alcoholism and alcohol abuse, drug abuse and dependency, financial problems, compulsive gambling, and eating disorders. Employee conversations and records under the EAP are strictly confidential. The administrative cost of this program is fully paid by the company.

9.4 Site Sanitation Plan (Section 02)

The following constitutes the site sanitation plan for this project.

9.4.1 Drinking Water

A cooler containing an adequate supply of drinking water will be available at the site for the site workers and replenished each day. The cooler will be stored outside the exclusion zone on or near the field vehicles. Clean, disposable cups will be provided, or bottled drinking water.

9.4.2 Toilets

Mobile crews will conduct all work on this site with transportation readily available. Toilets are readily available in the visitor's center and pass office near the site. (EM 385-1-1, Section 02.E.01.)

Access to toilets is available on the facility. However, toilet facilities on construction sites shall be provided as follows:

Minimum Toilet Facilities at Construction Sites

Number of Personnel	Number of Toilets
20 or fewer	One
20 or greater	One toilet seat and One urinal per 40 workers
Greater than 200	One toilet seat and One urinal per 50 workers

Note: The above requirements do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation immediately available to nearby toilet facilities. Separate toilet rooms for each sex need not be provided if toilet rooms can only be occupied by one person at a time, can be locked from the inside, and contain at least one toilet seat.

Toilet facilities shall be constructed so that the occupants are protected against weather and falling objects; all cracks shall be sealed, and the door shall be tight-fitting, self-closing, and capable of being latched. Adequate ventilation shall be provided and all windows and vents shall be screened. Toilet facilities shall be constructed so that the interior is lighted.

Provisions for routinely servicing and cleaning all toilets and disposing of the sewage shall be established before placing toilet facilities into operation. The method of sewage disposal and the placement location selected shall be in accordance with federal, state, and local health regulations.

9.4.3 Washing Facilities

Access to washing facilities is available at the same location as the toilets.

Washing facilities shall be provided at toilet facilities and as needed to maintain healthful and sanitary conditions. Each washing facility shall be maintained in a sanitary condition and provided with water (either hot and cold running water or tepid running water), soap, and individual means of drying. If it is not practical to provide running water, hand sanitizers may be used as a substitute. Washing facilities shall be in close proximity to the worksite.

9.4.4 Food Service

No food service will be provided onsite. Site workers will either bring their food to the site to be consumed outside of the exclusion zone and only after proper decontamination, or will go offsite for food.

9.4.5 Waste Disposal

Investigation-derived waste will be stored, profiled, and disposed of in accordance with the project work plan.

Nonhazardous waste materials and rubbish will be contained in a garbage bag and disposed of with regular site sanitary service disposal or at an offsite disposal facility.

9.4.6 Vermin Control

No enclosed spaces are being constructed for this project and waste materials will be securely stored and transported offsite to provide vermin control.

9.5 Access and Haul Road Plan (Section 4.B)

Not applicable. No access or haul roads are being constructed for this work.

9.6 Respiratory Protection Plan (Section 05.G)

Not applicable. Exposure to respiratory hazards is not anticipated for the scope of work being performed under this APP.

9.7 Health Hazard Control Plan (Section 06.A)

Safety and health hazards for performing work covered under this APP are identified through the preparation of AHAs (provided in Attachment A). Each AHA also indicates recommended controls for each identified potential safety/health hazard. Further hazards and controls are outlined in Sections 7 through 11 of Attachment A.

Appropriate PPE shall be supplied and used at all times for this project. PPE selection is based on the selected hazard control measures specified in the AHAs and Section 14 of Attachment A.

9.8 Hazard Communication Program

Chemical products may occasionally be stored and used on the project site, and/or stored on field vehicles. Examples of chemicals include hydrogen peroxide, gases used to calibrate sensing equipment, and lubricants. Other chemicals may be used as well. The chemicals may pose hazards, including flammability, corrosiveness, reactivity and incompatibility, and toxicity. Because of these potential hazards, special precautions must be taken including the following:

- Tracking and controlling hazardous chemical products received and stored.
- A hazard evaluation of each chemical product, using such sources as MSDSs.
- Informing workers of the potential hazards through training, MSDSs, and appropriate labeling of containers.
- Air monitoring in the case of potential respiratory hazards.
- Design and implementation of engineering controls such as ventilation and source control.
- Developing storage, handling, housekeeping, and decontamination procedures.
- Assigning appropriate PPE such as eye and face protection, gloves, body protection, and respirators. Respirator usage by CH2M or subcontractor employees will be in accordance with the employees' IIPP.
- Training personnel who will be handling chemicals on safe handling procedures, PPE, and emergency and spill cleanup procedures.

Hazardous substances that may be encountered in soil on the project site are not covered by this program. Attachment A, Section 12, addresses chemical and other hazard assessment and mitigation associated with site contaminants, including investigation and remediation of waste materials.

9.8.1 Chemicals Covered by this Project Program

For this program, chemicals considered to be hazardous are those:

- Listed in the OSHA Permissible Exposure Limits
- Included in the American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances (2007)
- Found to be suspected or confirmed carcinogens by the National Toxicology Program in the latest edition of the Annual Report on Carcinogens, or by the International Agency for Research on Cancer (IARC) in the latest edition of the IARC monographs

No chemicals are expected to be used during field activities as part of this scope of work.

Exceptions to this policy, by OSHA definition, include consumer products that are used in a consumer fashion and pose no more of an exposure hazard than a consumer would face.

9.8.2 Training

Employees who work with or are potentially exposed to hazardous chemicals will receive initial training on the elements of this Hazard Communication Program, including the following:

- Content and requirements of this program and the OSHA Hazard Communication Standard
- The potential physical and toxic hazards of the chemicals used in their work location, and especially the hazards of non-routine tasks
- Chemical inventory and tracking procedures
- Location of this Hazard Communication Program, the chemical inventory, and the MSDSs
- How to read MSDSs
- Methods to detect the release of or exposure to chemicals in their area
- Content and interpretation of labels
- Safe use and handling of chemicals
- Required PPE
- Basic emergency procedures

Additional training will be provided annually, whenever a new chemical is added to the workplace, and when non-routine tasks are planned.

9.8.3 Labeling

The SSHO will ensure that hazardous chemicals brought onto the site are properly labeled with at least the following information, in English, as a minimum, and the language of non-English-speaking employees who may use the product, as appropriate. This labeling includes the following:

- The identity of the product and chemical components
- Appropriate hazard warnings
- Name and address of the manufacturer, importer, or other responsible party

Hazard warnings will also be transmitted in the form of the National Fire Prevention Agency or Hazardous Materials Information System color-coded warnings, which are ranked on a 0 to 4 scale. When chemicals are transferred to a portable container, labels containing chemical identification and hazard warnings must be affixed to the portable container.

9.8.4 Current Onsite Inventory (see Attachments 2 and 3 of the SSHP)

Gasoline

9.9 Process Safety Management Plan (Section 06.B.04)

Not applicable. This work does not include chemical management.

9.10 Lead Abatement Plan

Not applicable. Lead is not known to be an exposure concern for this project.

9.11 Asbestos Hazard Control Plan

Not applicable. Asbestos is not known to be an exposure concern for this project.

9.12 Radiation Safety Program (Section 06.E.03.a)

Not applicable. Radiation hazards not anticipated for this work.

9.13 Abrasive Blasting (Section 06.H.01)

Not applicable. This work does not involve abrasive blasting. See Section 9.1 of the SSHP for specific details.

9.14 Heat/Cold Stress Monitoring Plan (Section 06.I.02)

See Sections 13.2.4 and 13.2.5 of Attachment A.

9.15 Crystalline Silica Monitoring Plan (Section 06.M)

Not applicable. Crystalline silica is not known to be an exposure concern for this project.

9.16 Night Operations Lighting Plan

Not applicable. Work will not be conducted at night.

9.17 Fire Prevention Plan

See Section 8.6 of Attachment A for more details.

9.18 Wildland Fire Management Plan

Not applicable. Wildland fires are not anticipated as a risk for this work.

9.19 Hazardous Energy Control Plan

Not applicable. Servicing or maintenance on a system where the unexpected energizing, startup, or release of kinetic or stored energy that could cause injury or damage to occur is not part of this project.

9.20 Critical Lift Procedures

Not applicable. No critical lifts will be performed under this scope of work.

9.21 Contingency Plan for Severe Weather

Not applicable. Development of a severe weather contingency plan is related to marine operations and therefore does not apply to this scope of work. However, exterior fieldwork on this project will be suspended if severe weather could impact field activities, especially lightning. Such work suspension will be communicated immediately to the project manager.

This information is covered in detail of Section 10.1 of the SSHP.

9.22 Float Plan (Section 19.F.04)

Not applicable. This work is not over water or requiring use of a boat.

9.23 Fall Prevention and Protection Plan (Section 21.C)

Not applicable. This work does not entail working on steep slopes or elevations above ground surface.

9.24 Demolition Plan (Engineering and Asbestos Surveys)

Not applicable. This work does not involve demolition. However, if such work is required, it will be done by a subcontractor, and they will be required to submit a plan that complies with this section.

9.25 Excavation/Trenching Plan (Section 25.A.01)

See Section 9.3 of Attachment A for specific details.

9.26 Emergency Rescue (Tunneling) (Section 26.A)

Not applicable. Tunneling and other underground construction is not necessary for this work.

9.27 Underground Construction Fire Prevention and Protection Plan

Not applicable. Tunneling and other underground construction is not necessary for this work.

9.28 Compressed Air Plan

Not applicable. Working in compressed air environments is not necessary for this work.

9.29 Formwork and Shoring Erection and Removal Plans

Not applicable. This work does not involve forming or shoring.

9.30 Precast Concrete Plan (Section 27.D)

Not applicable.

9.31 Jacking Plan (Lift) Slab Plans

Not applicable. These plans are associated with concrete masonry work, which is not part of this project.

9.32 Steel Erection Plan

Not applicable. This work does not involve steel erection.

9.33 Site Safety and Health Plan

An SSHP is attached to this APP as Attachment A. The SSHP meets the requirements for work on hazardous waste sites in accordance with 29 CFR 1910.120 and 29 CFR 1926.65.

Detailed site-specific hazards and controls are provided in Attachment A and AHAs.

9.34 Blasting Plan

A blasting plan, if necessary, will be provided by the UXO subcontractor.

9.35 Diving Plan

Not applicable. This work does not involve diving.

9.36 Confined Space

Not applicable. Entry or proximity to confined space is not required for this project.

Risk Management Processes

The specific processes are addressed in multiple sections of Attachment A, depending on whether classified as physical, chemical, or other type (see Sections 7 through 15), as well as the task-specific AHAs included in Attachment A.

Attachment A
Site Safety and Health Plan

Site Safety and Health Plan
UXO 20 Intrusive Investigation of DGM Anomalies

Naval Support Facility Indian Head
Indian Head, Maryland

Contract Task Order JU05

September 2015

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Herndon, Virginia

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/m ³	micrograms per cubic meter
AHA	activity hazard analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
APR	air purifying respirator
BATFE	Bureau of Alcohol, Tobacco, Firearms and Explosives
bpm	beats per minute
CAD	cartridge-actuated device
CFR	Code of Federal Regulations
CH2M	CH2M HILL
CO	carbon monoxide
COC	contaminant of concern
CPR	cardiopulmonary resuscitation
CRZ	contamination reduction zone
dBA	decibel(s) (A-weighted scale)
DEET	N,N-diethylmetatoluamide
DGM	digital geophysical mapping
DOT	Department of Transportation
EM	environmental manager
EME	earth moving equipment
EOD	explosive ordnance disposal
ERC	Emergency Response Coordinator
ESBG	Environmental Services Business Group
ESS	Explosives Safety Submission
EZ	exclusion zone
FID	flame ionization detector
GFCI	ground fault circuit interrupter
GPS	global positioning system
GW	groundwater
HAZWOPER	Hazardous Waste Operations and Emergency Response
HITS	Hours and Incident Tracking System
HSE	health, safety, and environment
HSM	Health and Safety Manager
IDLH	immediately dangerous to life and health
IRF	Incident Report Form
kV	kilovolt
LEL	lower explosive limit
MEC	munitions and explosives of concern
mg/kg	milligram per kilogram
mph	miles per hour
MPPEH	material potentially presenting an explosive hazard

MR	Munitions Response
MRS	munitions response site
MSDS	material safety data sheet
NAVFAC	Naval Facilities Engineering Command
NSFIH	Naval Support Facility Indian Head
OB	open burning
ORE	Opportunity Risk Evaluation
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAD	propellant-actuated device
PEL	permissible exposure limit
PID	photoionization detector
PIM	potentially infectious material
PM	project manager
PPE	personal protective equipment
ppm	parts per million
PTSP	Pre-task Safety Plan
RCA	Root Cause Analysis
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
REL	recommended exposure limit
RHSM	responsible health and safety manager
RI	Remedial Investigation
RMSF	Rocky Mountain Spotted Fever
ROICC	Resident Officer in Charge of Construction
RPM	Remedial Project Manager
RSL	regional screening level
SB	soil boring
SBO	safe behavior observation
SC	safety coordinator
SCBA	self-contained breathing apparatus
SOP	standard operating procedure
SSC	site safety coordinator
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
SVOC	semivolatile organic compound
SZ	support zone
TBD	to be determined
TLV	threshold limit value
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UV	ultraviolet
UXO	unexploded ordnance
UXOSO	UXO Safety Officer

Approval

This Site-Safety Health Plan (SSHP) has been written for use by CH2M HILL (CH2M) only. CH2M claims no responsibility for its use by others unless that use has been specified and defined in project or contract documents. The plan is written for the specific site conditions and identified scope(s) of work and must be amended if those conditions or scope(s) of work change.

By approving this SSHP, the responsible health and safety manager (RHSM) certifies that the personal protective equipment (PPE) has been selected based on the project-specific hazard assessment.

Date: September 2015

Plan Preparer:

Name: Stephen Brand, OHST
Phone Number: (757) 671-6211

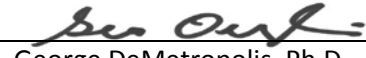
Date: 10/02/15

Plan Approval Project
Manager:

Name: Margaret Kasim, Ph.D.
CH2M HILL
Program/Project Manager
Phone: (703) 376-5154

Date:


Plan Approval
Munitions Response
HSSE Manager:



George DeMetropolis, Ph.D.
CH2M HILL
Munitions Response HSSE Manager
Phone: (619) 564-9627

Date: 10/14/15

Plan Concurrence:



Name: Mark Orman, CSP
CH2M HILL
Program/Responsible Health and Safety Manager
Phone: (865) 560-2825

Date: 10/5/2015

Introduction



Health, Safety and Environment Policy Commitment

Protection of people and the environment is a CH2M HILL core value. It is our vision to create a culture that empowers employees to drive this value into all global operations and achieve excellence in health, safety, and environment (HSE) performance.

CH2M HILL deploys an integrated, enterprise-wide behavior based HSE management system to fulfill our mission and the expectations of our clients, staff, and communities based on the following principles:

- We require all management and supervisory personnel to provide the leadership and resources to inspire and empower our employees to take responsibility for their actions and for their fellow employees to prevent injuries, illnesses, and adverse environmental impacts, and create a safe, healthy, and environmentally responsible workplace.
- We provide value to clients by tailoring HSE processes to customer needs and requiring CH2M HILL employees and subcontractors to deliver projects that identify HSE requirements and commit to compliance with applicable HSE laws and regulations, company standards, and external requirements.
- We are committed to pollution prevention in conjunction with our Sustainability Policy and by offering our clients sustainable solutions.
- We aspire to continually improve our performance and influence others to redefine world-class HSE excellence.
- We evaluate our design engineering and physical work environment to verify safe work conditions and practices are established, followed, and corrected as needed.
- We assess and continually improve our HSE program to achieve and maintain world-class performance by setting and reviewing objectives and targets, reporting performance metrics, and routinely evaluating our program.
- We expect all employees to embrace our Target Zero culture, share our core value for the protection of people and the environment, understand their obligations, actively participate, take responsibility, and "walk the talk" on and off the job.

The undersigned pledge our leadership, commitment and accountability for making this Policy a reality at CH2M HILL.

Dated the 3rd day of October, 2014

Jacqueline C. Hinman
Chairman and Chief Executive Officer

Mike Szomjessy
Chief Delivery Officer & Operational Excellence

Lisa Glatch
Executive Vice President, Client Solutions and Sales

John Medina
Chief Human Resources Officer

Gary McArthur
Chief Financial Officer

Tom McCoy
General Counsel & Corporate Secretary

Elisa Speranza
Chief Communications Officer

Greg McIntyre
Operations Director

1.1 CH2M HILL Policy and Commitment

1.1.1 Safe Work Policy

It is the policy of CH2M HILL (CH2M) to perform work in the safest manner possible. Safety must never be compromised. To fulfill the requirements of this policy, an organized and effective safety program must be carried out at each location where work is performed.

CH2M believes that all injuries are preventable, and we are dedicated to the goal of a safe work environment. To achieve this goal, every employee on the project must assume responsibility for safety.

Every employee is empowered to:

- Conduct their work in a safe manner
- Stop work immediately to correct any unsafe condition that is encountered
- Take corrective actions so that work may proceed in a safe manner

Safety, occupational health, and environmental protection will not be sacrificed for production. These elements are integrated into quality control, cost reduction, and job performance, and are crucial to our success.

1.1.2 Health and Safety Commitment

CH2M has embraced a philosophy for health and safety excellence. The primary driving force behind our commitment to health and safety is simple: employees are CH2M's most significant asset and CH2M management values their safety, health, and welfare. Also, top management believes that all injuries are preventable. CH2M's safety culture empowers employees at all levels to accept ownership for safety and take whatever actions are necessary to eliminate injury. Our company is committed to world-class performance in health and safety and also understands that world-class performance in health and safety is a critical element in overall business success.

CH2M is committed to the prevention of personal injuries, occupational illnesses, and damage to equipment and property in all of its operations; to the protection of the general public whenever it comes in contact with our work; and to the prevention of pollution and environmental degradation.

CH2M's management, field supervisors, and employees plan safety into each work task in order to prevent occupational injuries and illnesses. The ultimate success of CH2M's safety program depends on the full cooperation and participation of each employee.

CH2M management extends its full commitment to health and safety excellence.

1.1.3 Project-Specific Health, Safety, and the Environment Goals

All management and employees are to strive to meet the project-specific health, safety, and the environment (HSE) goals outlined below. The team will be successful only if everyone makes a concerted effort to accomplish these goals. The goals allow the project to stay focused on optimizing the health and safety of all project personnel and, therefore, making the project a great success.

The project has established the following 11 specific goals and objectives:

- Create an injury-free environment
- Have zero injuries or incidents
- Provide management leadership for HSE by communicating performance expectations, reviewing and tracking performance, and leading by example
- Ensure effective implementation of the SSHP through education, delegation, and teamwork
- Ensure 100 percent participation in HSE compliance
- Continuously improve our safety performance
- Maintain free and open lines of communication

- Make a personal commitment to safety as a value
- Focus safety improvements on high-risk groups
- Continue strong employee involvement initiatives
- Achieve health and safety excellence

SECTION 2

Applicability

This SSHP applies to the following:

- All CH2M staff, including subcontractors and tiered subcontractors of CH2M working on the site
- All visitors to the construction site in the custody of CH2M, including visitors from the client, the government, the public, and other staff of any CH2M company)

This SSHP does not apply to the third-party contractors, their workers, their subcontractors, their visitors, or any other persons not under the direct control or custody of CH2M.

This SSHP defines the procedures and requirements for the health and safety of CH2M staff and visitors when they are physically on the work site. The work site includes the project area (as defined by the contract documents) and the project offices, trailers, and facilities thereon.

This SSHP will be kept onsite during field activities and will be reviewed as necessary. The SSHP will be amended or revised as project activities or conditions change or when supplemental information becomes available.

The SSHP adopts, by reference, the Enterprise-wide Core Standards and standard operating procedures (SOPs), as appropriate. In addition, the SSHP may adopt procedures from the project work plan and any governing regulations. If there is a contradiction between this SSHP and any governing regulation, the more stringent and protective requirement will apply.

All CH2M staff and subcontractors must sign the employee signoff form included in this document (Attachment 1) to acknowledge review of this document. Copies of the signature page will be maintained onsite by the site safety and health officer (SSHO).

General Project Information

3.1 Project Information and Background

Project Number: 424770.FI.FK.20

Client: Naval Facilities Engineering Command (NAVFAC) Washington

Project/Site Name: UXO 20 Safety Thermal Treatment Point, Naval Support Facility Indian Head (NSFIH)

Site Address: Indian Head, Maryland

CH2M Project Manager: Margaret Kasim

CH2M Office: WDC

DATE HSP Prepared: 10-02-2015

Date(s) of Site Work: Summer 2016

3.2 Site Background and Setting

UXO 20, Safety Thermal Treatment Point, in the Preliminary Assessment (PA) report (Malcolm Pirnie, 2005) is a 1.6-acre site at the end of Old Burn Point Way on a peninsula that extends southwest from the Main Installation into the confluence of Mattawoman Creek and the Potomac River. According to the Initial Assessment Study (Fred C. Hart Associates, 1983), it is a manmade peninsula constructed of sand, fill material, rocket motor casings, empty cartridges, and coal fly ash. Based on a conversation between CH2M and NSFIH personnel on August 2, 2011, the northern part of the peninsula is active and is being used by NSFIH to test hand grenades. Based on this information, the boundary of UXO 20 has been adjusted to include the southern part and spits of the peninsula, totaling approximately 0.97 acre. At present, the site or UXO 20 refers to the area in the southern part of the peninsula.

The history of munitions and explosives of concern (MEC) use on the peninsula, including UXO 20, is documented in the PA. The PA reports that the peninsula was built between approximately 1940 and 1942 and was set up for two separate uses: (1) a primary burn area, located from the tip of the peninsula to approximately 150 feet inland (UXO 20), was used for open burning (OB) of munitions (cartridge-actuated devices [CADs] and propellant-actuated devices [PADs]); and (2) a secondary burn area, which covered the remainder of the peninsula and was used for munitions testing, including deflagration-to-detonation testing and pierce testing.

The PA report noted the presence of a large cylindrical unit (former burn tank), a freestanding metal frame, a steel deflection shield, and miscellaneous explosives testing equipment. The former burn tank and steel deflection shield are located in the primary burn area. The former burn tank, which is approximately 8 feet high and 10 feet in diameter, was used to minimize ash and debris emissions during burning. The steel deflection shield is approximately 15 feet high and 15 feet wide and is believed to have been used to block flying debris from the burn tank from reaching the Potomac River and Mattawoman Creek.

CH2M has completed a Phase I Remedial Investigation (RI) for this site, which consisted of vegetation reduction, removal of burn containment equipment (former burn tank, steel deflection shield, and part of a burn tank) and surface items (metals), and digital geophysical mapping (DGM) survey. Following the DGM, a statistical analysis was performed to calculate the number of anomalies to be intrusively investigated. Based on the statistical tool, Estimating a Proportion Method, 213 anomalies were calculated for intrusive investigation to characterize the anomaly population. The total dig count was 215 after including the quality control (QC) seeds in the final dig list.

The scope of work for this Accident Prevention Plan (APP)/SSHP is anomaly reacquisition by subcontractor of all anomalies, then intrusive investigation by subcontractor to characterize the sources of the anomalies. If MEC or

material potentially presenting an explosive hazard (MPPEH) items are found and are safe to move, the subcontractor will move them to a detonation trench and safely detonate them. If they are deemed unsafe to move, the items will be blown in place by the UXO subcontractor.

This plan outlines the health and safety procedures that will be used to conduct oversight of DGM, intrusive investigation, and MEC/MPPEH disposal. The work is expected to be performed in the summer of 2016. This project-specific SSHP will be used by CH2M and its subcontractors to identify and mitigate task-specific hazards and to select appropriate health and safety protective measures.

See Site Map in Section 3.6 for layout of work area.

3.3 Contractor Accident Experience

CH2M's safety performance exceeds the industry average. Our injury and illness rates and our experience modification rate have decreased dramatically over the past 5 years. See Section 2.5 of the APP for details on past 5 years of history.

3.4 Description of Tasks

All CH2M and subcontractor employees engaging in hazardous waste operations (HAZWOPER) or emergency response will receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926.65 (or if required by subcontract). Personnel who have not met these training requirements will not be allowed to engage in HAZWOPER or emergency response activities. See the following subsection for HAZWOPER-regulated tasks.

3.4.1 HAZWOPER-regulated Tasks

- DGM (anomaly reacquisition) (subcontractor)
- Intrusive investigation of anomalies (subcontractor)
- MEC/MPPEH detonation/disposal

3.4.2 Non-HAZWOPER-regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state HAZWOPER regulations are not applicable. The following tasks do not involve exposure to safety or health hazards associated with the hazardous waste operations. HAZWOPER training or medical requirements do not apply for the following tasks:

Tasks	Controls
<ul style="list-style-type: none">• None	<ul style="list-style-type: none">• Brief on hazards, limits of access, and emergency procedures.• Post areas of contamination as appropriate.• Perform air sampling/monitoring as specified in this SSHP.

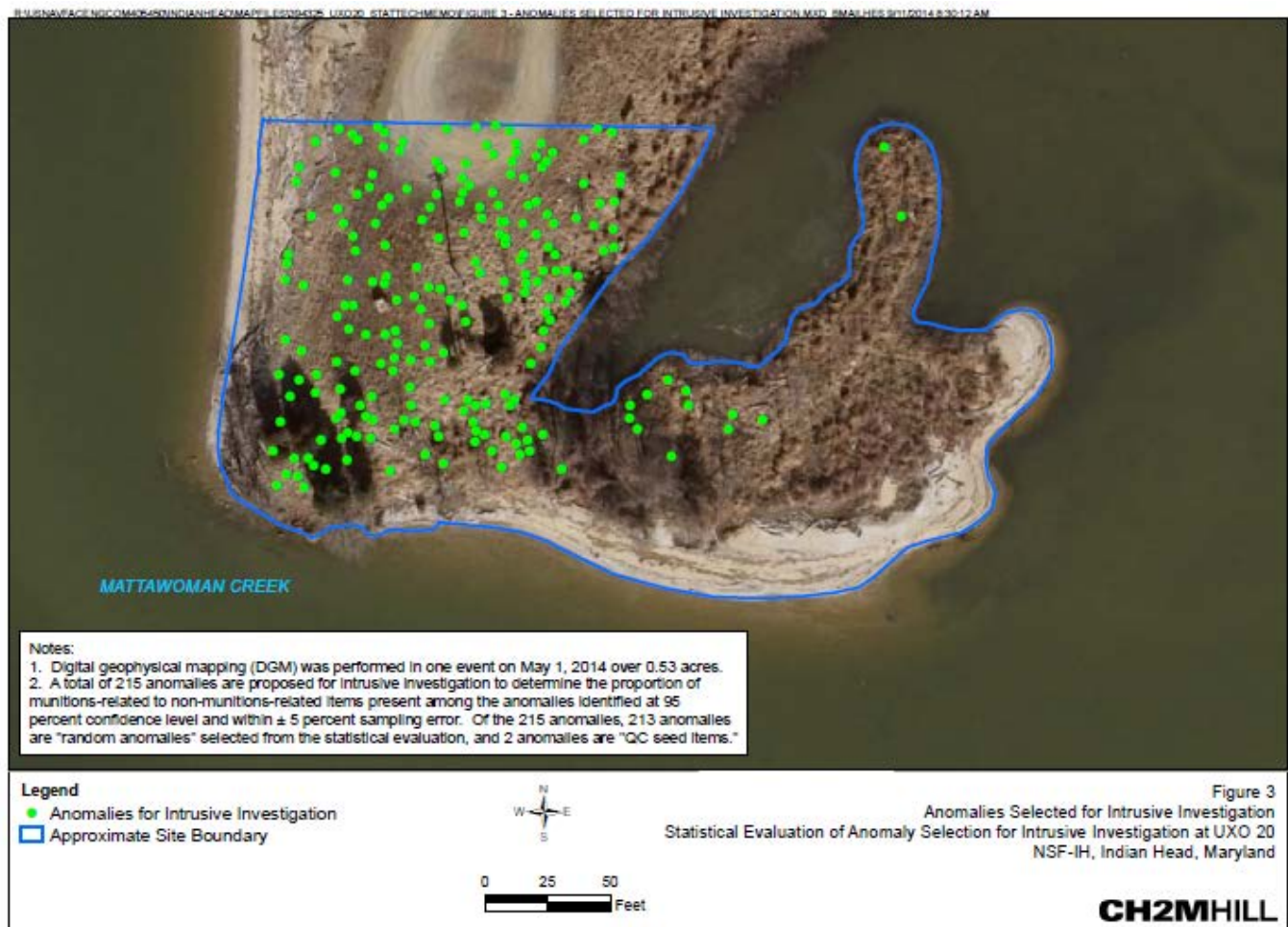
3.5 Tasks Requiring Activity Hazard Analysis

Activity hazard analyses (AHAs) are required for all definable work tasks. As the project gets closer to initiation of field operations, additional information such as identification of subcontractor, specific equipment and/or tools is obtained, the AHAs will be updated accordingly. The planned field tasks requiring AHAs are as follows:

- 01 General Oversight
- 02 DGM (subcontractor)
- 03 Intrusive investigation of anomalies (subcontractor)
- 04 MEC/MPPEH disposal (subcontractor)

Refer to Section 7 for information regarding AHA preparation, training, and use for visual inspection and all other tasks associated with this project. The project AHAs for the hazardous work operations listed above are included in Attachment 10.

3.6 Site Map



Project Organization and Responsibilities

4.1 Client

Contact Name: Joe Rail, RPM

Phone: (202) 685-3105

Facility Contact Name: Travis Wray,

Phone: (301) 744-2262

4.2 CH2M HILL

4.2.1 Project Manager

Project Manager Name: Margaret Kasim

CH2M Office: WDC

Telephone Number: (703) 376-5154

Cellular Number: (703) 431-8288

The project manager (PM) is responsible for providing adequate resources (budget and staff) for project-specific implementation of the HSE management process. The PM has overall management responsibility for the tasks in the following bulleted list. The PM may explicitly delegate specific tasks to other staff, as described in sections that follow, but retains ultimate responsibility for completion of the following in accordance with this document:

- Incorporate standard terms and conditions, and contract-specific HSE roles and responsibilities in contract and subcontract agreements (including flow-down requirements to lower-tier subcontractors).
- Select safe and competent subcontractors by:
 - Choosing potential subcontractors based on technical ability and HSE performance
 - Implementing the subcontractor prequalification process
 - Ensuring that acceptable certificates of insurance, including CH2M as named additional insured, are secured as a condition of subcontract award
 - Ensuring HSE submittals, subcontract agreements, and appropriate site-specific safety procedures are in place and accepted prior field mobilization
- Ensure copies of training and medical monitoring records, and site-specific safety procedures are being maintained in the project file accessible to site personnel.
- Provide oversight of subcontractor HSE practices per the site-specific safety plans and procedures.
- Manage the site and interfacing with third parties in a manner consistent with the contract and subcontract agreements and the applicable standard of reasonable care.
- Ensure that the overall, job-specific, HSE goals are fully and continuously implemented.
- Provide visible support and motivation for HSE programs, rules, procedures, processes, and training, leading by example and encouraging CH2M employees to take ownership of HSE issues.
- Intervene or stop work when an unsafe condition or behavior is observed, and/or when an environmentally compromising condition is encountered.
- Make available to and require CH2M employees to complete required HSE training within established timelines and provide project numbers for such training.

- Consistently and even-handedly enforce HSE rules, procedures, and requirements at the office and/or on project work sites.
- Promptly report all work-related HSE incidents or near misses.
- Wear any required PPE.
- Ensure CH2M employees complete required HSE training within established timelines.
- Conduct, cooperate, or assist with HSE incident investigations.
- Consult with the Human Resources Delivery Partner before taking any disciplinary action (other than verbal counseling) associated with CH2M Policy 203 and/or HSE programs rules, procedures, processes, and training.

4.2.2 CH2M HILL Responsible Health and Safety Manager, CSP

RHSM Name: Mark Orman

CH2M Office: KNV

Telephone Number: (865) 560-2825

Cellular Number: (414) 712-4138

The RHSM is responsible for the following:

- Review and evaluate subcontractor HSE performance using the pre-qualification process.
- Approve the SSHP and its revisions as well as AHA.
- Review and evaluate subcontractor site-specific safety procedures for adequacy prior to start of subcontractor's field operations.
- Support the oversight (or SSHO's direct oversight) of subcontractor and tiered subcontractor HSE practices.
- Permit upgrades and downgrades in respiratory protection after reviewing analytical data.
- Conduct audits as determined by project schedule and coordination with PM.
- Participate in incident investigations, lessons learned, and loss and near loss reporting.

4.2.3 CH2M HILL Project Environmental Manager

Environmental Manager Name: Hope Wilson

CH2M Office: ATL

Telephone Number: (678) 530-4226

Cellular Number: (678) 656-5411

The project environmental manager (EM) is responsible for the following:

- Provide environmental program support in areas such as training, auditing, planning, permit tracking, and subcontractor oversight as needed or as specified in the project environmental plan.
- Review and evaluate qualifications for subcontractors with a history of environmental noncompliance and for waste transportation and disposal subcontractors.
- Evaluate any spills, releases, or environmental permit incidents for appropriate follow-up actions, notifications, and recordkeeping requirements.
- Provide environmental compliance and environmental management expertise and advice to the project team as needed during the course of the project.

4.2.4 CH2M HILL Site Safety Health Officer

SSHO Name: Nelson Figeac

CH2M Office: VBO

Telephone Number: (757) 671-8311

Cellular Number: (757) 288-0374

The SSHO is responsible for verifying that the project is conducted in a safe manner including the following specific obligations:

- Conduct a health, safety, and environment orientation for all team members prior to entering the project work areas.
- Verify compliance with the requirements of this SSHP and applicable contractor SSHP, U.S. Army Corps of Engineers (USACE) EM 385-1-1 Manual, and federal, state, and local regulations.
- Verify this SSHP is current and amended when project activities or conditions change.
- Verify CH2M site personnel and subcontractor personnel read the SSHP and sign the Employee Signoff Form, before commencing field activities.
- Verify CH2M site personnel have completed any required specialty training (for example, fall protection, confined space entry, etc.) and medical surveillance as identified in this SSHP.
- Verify that project files include copies of subcontractor training and medical monitoring records, and accepted site-specific safety procedures prior to start of subcontractor's field operations.
- Act as the project "Hazard Communication Coordinator," and perform the responsibilities outlined in the SSHP.
- Act as the project "Emergency Response Coordinator," and perform the responsibilities outlined in the SSHP.
- Act as the project competent person for general tasks not conducted by a specialized subcontractor.
- Post the Occupational Safety and Health Administration (OSHA) job-site poster—the poster is required at sites where project field offices, trailers, or equipment-storage boxes are established. If you work in a state with an OSHA state plan, make sure the state plan poster is posted, if required.
- Hold and/or verify that safety meetings are conducted and documented in the project file initially and as needed throughout the course of the project (as tasks or hazards change).
- Verify that project health and safety forms and permits are being used as outlined this SSHP.
- Perform oversight and assessments of subcontractor HSE practices per the site-specific safety plan, and verify that project activity self-assessment checklists are being used as outlined this SSHP.
- Coordinate with the RHSM regarding CH2M and subcontractor operational performance, and third-party interfaces.
- Verify appropriate PPE use, availability, and training.
- Ensure that the overall, job-specific, HSE goals are fully and continuously implemented.
- Conduct accident investigations, including root cause analysis.
- Calibrate and conduct air monitoring in accordance with the SSHP, and maintain all air monitoring records in the project file.
- Maintain HSE records and documentation.
- Facilitate client, OSHA, or other government agency inspections, including accompanying the inspector and providing all necessary documentation and follow-up.
- Deliver field HSE training as-needed, based on project-specific hazards and activities.

- Consistently and even-handedly enforce HSE rules, procedures, and requirements at the office and/or on project work sites.
- Wear any required PPE.
- Conduct, cooperate, or assist with HSE incident investigations.
- Contact the PM and RHSM when standards of conduct or CH2M Policy 203 has been violated by a CH2M employee.
- Contact the RHSM and PM in the event of an incident.
- Contact the RHSM and project EM in the event of a spill or release immediately so evaluation of reportable quantity requirements and whether agency reporting is required.
- When an apparent imminent danger exists, immediately remove all affected CH2M employees and subcontractors, notify subcontractor safety representative, stop affected work until adequate corrective measures are implemented, and notify the PM and RHSM as appropriate.
- Document all verbal health-and-safety-related communications in project field logbook, daily reports, or other records.

4.3 CH2M HILL Subcontractors

(Reference CH2M SOP HSE-215, *Contracts and Subcontracts*)

Subcontractor: DGM to be determined (TBD)

Subcontractor Contact Name: TBD

Telephone: TBD

Subcontractor: MEC intrusive investigation TBD

Subcontractor Contact Name: TBD

Telephone: TBD

Subcontractors must comply with the following activities, and are responsible to for the following:

- Comply with all local, state, and federal safety standards.
- Comply with project and owner safety requirements.
- Actively participate in the project safety program and either hold or attend and participate in all required safety meetings.
- Provide a qualified safety representative to interface with CH2M.
- Maintain safety equipment and PPE for their employees.
- Maintain and replace safety protection systems damaged or removed by the subcontractor's operations.
- Notify the SSHO of any accident, injury, or incident (including spills or releases) immediately, and submit reports to CH2M within 24 hours.
- Install contractually required general conditions for safety (for example, handrail, fencing, fall protection systems, floor opening covers).
- Conduct and document weekly safety inspections of project-specific tasks and associated work areas.
- Conduct site-specific and job-specific training for all subcontractor employees, including review of the CH2M SSHP, subcontractor health and safety plans, and subcontractor AHAs, and sign appropriate signoff forms.
- Determine and implement necessary controls and corrective actions to correct unsafe conditions.

The subcontractors listed above may be required to submit their own site-specific health and safety plan and other plans such as lead or asbestos abatement compliance plans. Subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit their plans to CH2M for review and acceptance before the start of fieldwork.

Subcontractors are also required to prepare AHAs before beginning each activity posing hazards to their personnel. The AHA will identify the principle steps of the activity, potential health and safety hazards for each step, and will recommended control measures for each identified hazard. In addition, a listing of the equipment to be used to perform the activity, inspection requirements, and training requirements for the safe operation of the equipment listed must be identified.

4.4 Employee Responsibilities

All personnel are assigned responsibility for safe and healthy operations. This concept is the foundation for involving all employees in identifying hazards and providing solutions. For any operation, individuals have full authority to stop work and initiate immediate corrective action or control. In addition, each worker has a right and responsibility to report unsafe conditions or practices. This right represents a significant facet of worker empowerment and program ownership. Through shared values and a belief that all accidents are preventable, our employees accept personal responsibility for working safely.

Each employee is responsible for the following performance objectives:

- Understanding and abiding by CH2M and client HSE programs, rules, procedures, processes, and training, including any that are project-specific
- Completing all required HSE training made available and accessible within established timelines
- Always wearing any required personal protective equipment
- Intervening or stopping work for you or other CH2M employees when an unsafe condition or behavior is encountered or observed, and/or when an environmentally compromising condition exists
- Promptly notifying a supervisor, PM, SSHO, or RHSM when an unsafe condition or behavior is observed, and/or when an environmentally compromising condition exists
- Promptly reporting a supervisor, PM, SSHO, or RHSM all work-related health, safety , and environmental incidents or near misses
- Attending required project HSE pre-task briefings and meeting prior to performing work
- Cooperating or assisting with HSE incident investigations

4.4.1 Employee Authority

Each employee on the project has the obligation and authority to shut down any perceived unsafe work and during employee orientation, each employee will be informed of their authority to do so.

4.5 Client Contractors

(Reference CH2M SOP HSE-215, Contracts, Subcontracts and HSE Management Practices)

Contractor: None

This SSHP does not cover contractors that are contracted directly to the client or the owner. CH2M is not responsible for the health and safety or means and methods of the contractor's work, and we must never assume such responsibility through our actions (such as advising on health and safety issues). In addition to these instructions, CH2M team members should review contractor safety plans so that we remain aware of appropriate precautions that apply to us. Self-assessment checklists are to be used by the safety coordinator (SC) and CH2M team members to review the contractor's performance only as it pertains to evaluating CH2M exposure and safety. The RHSM is the only person who is authorized to comment on or approve contractor safety procedures.

Health-and-safety-related communications with contractors should be conducted as follows:

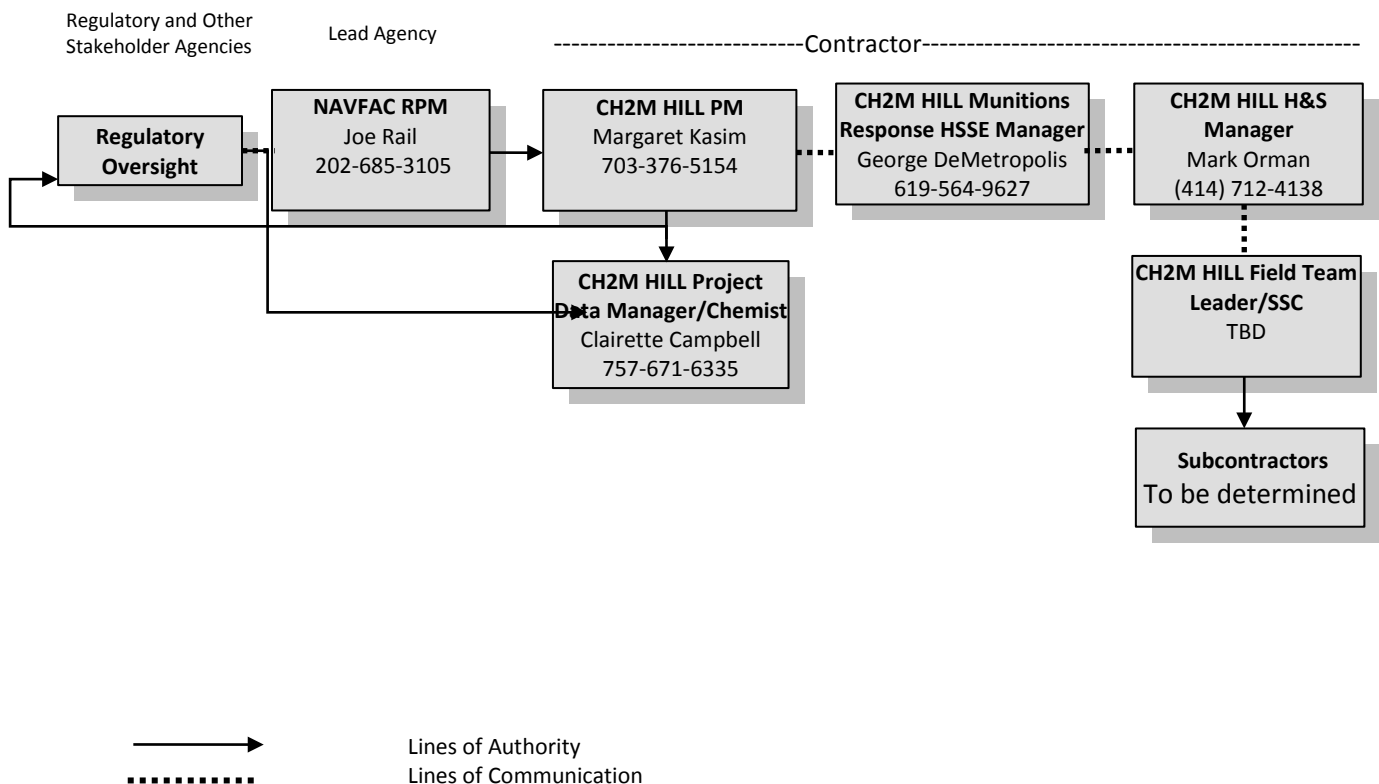
- Request the contractor to brief CH2M team members on the precautions related to the contractor's work
- When an apparent contractor noncompliance or unsafe condition or practice poses a risk to CH2M team members, conduct the following:
 - Notify the contractor safety representative
 - Request that the contractor determine and implement corrective actions
 - If necessary, stop affected CH2M work until contractor corrects the condition or practice
 - Notify the client, PM, and RHSM as appropriate

If apparent, contractor noncompliance or unsafe conditions or practices are observed, inform the contractor safety representative (CH2M's obligation is limited strictly to informing the contractor of the observation; the contractor is solely responsible for determining and implementing necessary controls and corrective actions).

If an apparent imminent danger is observed, immediately warn the contractor employee(s) in danger and notify the contractor safety representative (CH2M's obligation is limited strictly to immediately warning the affected individual(s) and informing the contractor of the observation; the contractor is solely responsible for determining and implementing necessary controls and corrective actions).

All verbal health-and-safety-related communications will be documented in the project field logbook, daily reports, or other records.

4.6 Lines of Authority



Standards of Conduct

All individuals associated with this project must work injury-free and drug-free and must comply with the following standards of conduct, the SSHP, and the safety requirements of CH2M. Commonly accepted standards of conduct help maintain good relationships between people. They promote responsibility and self-development. Misunderstandings, frictions, and disciplinary action can be avoided by refraining from thoughtless or wrongful acts.

5.1 Standards of Conduct Violations

All individuals associated with this project are expected to behave in a professional manner. Violations of the standards of conduct would include, but not be limited to, the following:

- Failure to perform work
- Inefficient performance, incompetence, or neglect of work
- Willful refusal to perform work as directed (insubordination)
- Negligence in observing safety regulations, poor housekeeping, or failure to report on-the-job injuries or unsafe conditions
- Unexcused or excessive absence or tardiness
- Unwillingness or inability to work in harmony with others
- Discourtesy, irritation, friction, or other conduct that creates disharmony
- Harassment or discrimination against another individual
- Failure to be prepared for work by wearing the appropriate construction clothing or bringing the necessary tools
- Violation of any other commonly accepted reasonable rule of responsible personal conduct

5.2 Disciplinary Actions

The Environmental Services Business Group (ESBG) employees, employees working on ESBG projects, and subcontractor employees are subject to disciplinary action for not following HSE rules and requirements. Potential disciplinary action is equally applicable to all employees, including management and supervision. Disciplinary action may include denial of access to the worksite, warnings, reprimands, and other actions up to and including termination depending on the specific circumstances.

5.3 Subcontractor Safety Performance

CH2M should continuously endeavor to observe subcontractors' safety performance and adherence to their plans and AHAs. This endeavor should be reasonable, and include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. CH2M is not responsible for exhaustive observation for hazards and unsafe practices. CH2M oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

5.3.1 Observed Hazard Form

When apparent noncompliance or unsafe conditions or practices are observed, notify the subcontractor's supervisor or safety representative verbally, and document using the Observed Hazard Form, included as an attachment to this SSHP, and require corrective action.

If necessary, stop subcontractor's work using the Stop Work Order Form until corrective actions is implemented for observed serious hazards or conditions. Update the Observed Hazard Form to document corrective actions

have been taken. The subcontractor is responsible for determining and implementing necessary controls and corrective actions.

5.3.2 Stop Work Order

CH2M has the authority, as specified in the contract, and the responsibility to stop work in the event any CH2M employee observes unsafe conditions or failure of the subcontractor to adhere to its safe work practices, or observes a condition or practice that may result in a release or violation of an environmental requirement. This authority and action does not in any way relieve the subcontractor of its responsibilities for the means and methods of the work or, therefore, of any corrective actions. Failure to comply with safe work practices can be the basis for restriction or removal of the subcontractor staff from the job site, termination of the subcontract, restriction from future work, or all three.

When an apparent imminent danger is observed, immediately stop work and alert all affected individuals. Remove all affected CH2M employees and subcontractor staff from the danger, notify the subcontractor's supervisor or safety representative, and do not allow work to resume until adequate corrective measures are implemented. Notify the PM, contract administrator, and RHSM.

When repeated noncompliance or unsafe conditions are observed, notify the subcontractor's supervisor or safety representative and stop affected work by completing and delivering the Stop Work Order Form (attached to this SSHP) until adequate corrective measures are implemented. Consult the contract administrator to determine what the contract dictates for actions to pursue in event of subcontractor noncompliance including work stoppage, back charges, progress payments, removal of subcontractor manager, monetary penalties, or termination of subcontractor for cause.

5.4 Incentive Program

Each project is encouraged to implement a safety incentive program that rewards workers for exhibiting exemplary safety behaviors. Actions that qualify are those that go above and beyond what is expected. Actions that will be rewarded include spotting and correcting a hazard, bringing a hazard to the attention of your foreman, telling your foreman about an incident, coming up with a safer way to get the work done, or stopping a crew member from doing something unsafe. The program will operate throughout the project, covering all workers. The incentive program will be communicated to all employees during the project employee orientation and project safety meetings.

5.5 Reporting Unsafe Conditions/Practices

Responsibility for effective health and safety management extends to all levels of the project and requires good communication between employees, supervisors, and management. Accident prevention requires a proactive policy on near misses, close calls, unsafe conditions, and unsafe practices. All personnel must report any situation, practice, or condition which might jeopardize the safety of our projects. All unsafe conditions or unsafe practices will be corrected immediately. CH2M has zero tolerance of unsafe conditions or unsafe practices.

No employee or supervisor will be disciplined for reporting unsafe conditions or practices. Individuals involved in reporting the unsafe conditions or practices will remain anonymous.

The following reporting procedures will be followed by all project employees:

- Upon detection of any unsafe condition or practice, the responsible employee will attempt to safely correct the condition.
- The unsafe condition or practice will be brought to the attention of the worker's direct supervisor, unless the unsafe condition or practice involves the employee's direct supervisor. If so, the SSHO needs to be notified at once by the responsible employee.
- Either the responsible employee or responsible employee's direct supervisor is responsible for immediately reporting the unsafe condition or practice to the SSHO.

- The SSHO will act promptly to correct the unsafe condition or practice.
- Details of the incident or situation will be recorded by the SSHO in the field logbook. If the subcontractor was involved, the Observed Hazard Form will be used.

Safety Planning and Change Management

6.1 Daily Safety Meetings and Pre-task Safety Plans

Daily safety meetings are to be held with all project personnel in attendance to review the hazards posed and required HSE procedures and AHAs that apply for each day's project activities. The Pre-task Safety Plans (PTSPs) serve the same purpose as the general assembly safety meetings, but the PTSPs are held between the crew supervisor and their work crews to focus on hazards posed to individual work crews.

At the start of each day's activities, the crew supervisor completes the PTSP, provided as an attachment to this HSP, with input from the work crew, during their daily safety meeting. The day's tasks, personnel, tools, and equipment that will be used to perform the tasks listed, along with the hazards posed and required HSE procedures, in the HSP and AHA. The use of PTSPs promotes worker participation in the hazard recognition and control process while reinforcing the task-specific hazard and required HSE procedures with the crew each day.

6.2 Change Management

This HSP addresses all known activities and associated hazards. As work progresses, if significant changes are identified that could affect health and safety at the site, coordinate with the RHSM to determine whether an HSP update is necessary.

The following are examples of changes that may require a revision to the plan:

- Change in CH2M staff
- New subcontractor to perform work
- New chemicals brought to site for use
- Change in scope or addition of new tasks
- Change in contaminants of concern (COCs) or change in concentrations of COCs
- New hazards or hazards not previously identified that are not addressed in this SSHP

6.3 Agency Inspection Guidance

(Reference CH2M SOP HSE-201, Agency Inspections and Communications)

Agency inspections (for example, OSHA, the U.S. Environmental Protection Agency (USEPA), or other regulatory agencies) are on the rise. CH2M implements safety and environmental programs in order to ensure safety to workers, the public, and the environment. This plan addresses things like labeling containers, completing the hazard communication training using the attachments to this SSHP, listing training requirements and PPE requirements, and addressing project-specific hazards. Field personnel need to contact the RHSM to update this plan if hazards are encountered that are not addressed.

[SOP HSE-201](#) addresses agency inspections in detail, and the attached **Target Zero Bulletin on Agency Inspections** provides a good summary of the inspection process and what to do if an agency such as OSHA or USEPA shows up at the site. It is critical immediately notify the RHSM if an inspector arrives (and EM if it is environmental-related) because they can help facilitate and make additional notifications.

Review the Target Zero Bulletin and keep it with your Health and Safety Plan/Environmental Plan. Make it a topic at a safety meeting, and keep it readily available in the event of an inspection.

SECTION 7

Project Hazard Analysis and Health Hazard Control Program

(Reference: EM 385-1-1 Section 01.B.06)

The Health Hazard Control Program will be conducted by the use of the AHA process. This section outlines the process that will be used by the SSHO onsite to determine the presence of hazardous environments or whether hazardous or toxic agents could be released into the work environment.

A health and safety risk analysis (Table 1) has been performed for each task. In the order listed below, the RHSM considers the various methods for mitigating the hazards. Employees are trained on this hierarchy of controls during their hazardous waste training and reminded of them throughout the execution of projects:

- Elimination of the hazards (use remote sampling methodology to avoid going into a confined space)
- Substitution (reduce exposure to vapors by using of a geoprobe instead of test pitting)
- Engineering controls (ventilate a confined space to improve air quality)
- Warnings (establish exclusion zones to keep untrained people away from hazardous waste work)
- Administrative controls (implement a work-rest schedule to reduce chance of heat stress)
- Use of PPE (use of respirators when action levels are exceeded)

The hazard controls and safe work practices are summarized in the following sections of this SSHP:

- General hazards and controls
- Project-specific hazards and controls
- Physical hazards and controls
- Biological hazards and controls
- COCs

7.1 Activity Hazard Analysis

An AHA must be developed for each CH2M job activity. The AHA should define the work tasks required to perform each activity, along with potential HSE hazards and recommended control measures for each hazard. A listing of the equipment to be used to perform the activity, inspection requirements to be performed, and training requirements for the safe operation of the equipment listed must be identified. Workers are briefed on the AHA before performing the work and their input is solicited prior to, during, and after the performance of work to further identify the hazards posed and control measures required. The AHA should identify the work tasks required to perform each activity, along with potential HSE hazards and recommended control measures for each hazard.

The hazard controls described in the following sections and applicable CH2M core standards and SOPs should be used as a basis for preparing AHAs.

AHAs prepared for CH2M activities and subcontractors are included as an attachment to this SSHP.

7.2 Subcontractor Activity Hazard Analysis

CH2M subcontractors are required to provide AHAs specific to their scope of work on the project for acceptance by CH2M. Each subcontractor will submit AHAs for its field activities, as defined in its scope of work, along with a project-specific safety plan and procedures. Additions or changes in field activities, equipment, tools, or material used to perform work or hazards not addressed in existing AHAs requires either a new AHA to be prepared or an existing AHA to be revised.

TABLE 1
General Activity Hazard Analysis

Potential Hazard	Project Activity		
	Anomaly Reacquisition by DGM	Anomaly Intrusive Investigation	MEC/MPPEH Disposal
Blasting/Explosives		X	X
Biological Hazards	X	X	X
Earthmoving Equipment		X	X
Excavations		X	
Explosives Usage or Munitions Response	X	X	X
Field Vehicles	X	X	X
Fire Prevention		X	X
Hand & Power Tools	X	X	X
Knife Use		X	X
Manual Lifting	X	X	X
MEC/MMPEH	X	X	X
Noise	X	X	X
Temperature Extremes	X	X	X
Ultraviolet Light exposure (sunburn)	X	X	X
Utilities (underground/overhead)		X	X
Working around Material Handling Equipment		X	X

SECTION 8

General Hazards and Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. It is a summarized list of requirements. Always consult the appropriate CH2M SOP to ensure all requirements are implemented.

8.1 Bloodborne Pathogens

(Reference CH2M SOP HSE-202, *Bloodborne Pathogens*)

Exposure to bloodborne pathogens may occur when rendering first-aid or cardiopulmonary resuscitation (CPR), or when coming into contact with landfill waste or waste streams containing potentially infectious material (PIM).

Employees trained in first-aid/CPR or those exposed to PIM must complete CH2M's 1-hour bloodborne pathogens computer-based training module annually. When performing first-aid/CPR the following apply:

- Observe universal precautions to prevent contact with blood or other PIMs. Where differentiation between body fluid types is difficult or impossible, consider all body fluids to be potentially infectious materials.
- Always wash your hands and face with soap and running water after contacting PIMs. If washing facilities are unavailable, use an antiseptic cleanser with clean paper towels or moist towelettes.
- If necessary, decontaminate all potentially contaminated equipment and surfaces with chlorine bleach as soon as possible. Use one part chlorine bleach (5.25 percent sodium hypochlorite solution) diluted with 10 parts water for decontaminating equipment or surfaces after initially removing blood or other PIMs. Remove contaminated PPE as soon as possible before leaving a work area.

CH2M will provide exposed employees with a confidential medical examination should an exposure to PIM occur. The examination includes the following procedures:

- Documenting the exposure
- Testing the exposed employee's and the source individual's blood (with consent)
- Administering post-exposure prophylaxis

8.2 Chemical Storage

The following are general guidelines for storing chemicals and other hazardous materials:

- Keep acids away from bases
- Keep oxidizers (nitric acid, nitrates, peroxides, chlorates) and organics away from inorganic reducing agents (metals)
- Keep flammables and corrosives in appropriate storage cabinets
- Do not store paper or other combustibles near flammables
- Use secondary containment and lipped shelving that is secured
- Have a fire suppression system available

8.2.1 Storage of Flammable/Combustible Liquids

- Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids.
- Approved safety cans shall be used for the handling and use of flammable liquids in quantities of 5 gallons (19 liters) or less. Do not use plastic gas cans.

- For quantities of 1 gallon (3.78 liters) or less, the original container may be used for storage and use of flammable liquids.
- Flammable or combustible liquids shall not be stored in areas used for stairways or normally used for the passage of people.

8.2.2 Indoor Storage of Flammable/Combustible Liquids

- No more than 25 gallons (95 liters) of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet.
- Quantities of flammable and combustible liquids in excess of 25 gallons (95 liters) shall be stored in an acceptable or approved cabinet.
- Cabinets shall be conspicuously lettered: "FLAMMABLE: KEEP FIRE AWAY."
- Not more than 60 gallons (228 liters) of flammable or 120 gallons (456 liters) of combustible liquids shall be stored in any one storage cabinet. Not more than three such cabinets may be located in a single storage area.

8.2.3 Outside Storage of Flammable/Combustible Liquids

- Storage of containers (not more than 60 gallons [228 liters] each) shall not exceed 1,100 gallons (4,180 liters) in any one area. No area shall be within 20 feet (6.1 meters) of any building.
- Storage areas shall be graded to divert spills away from buildings and surrounded by an earthen dike.
- Storage areas may not be located near a storm drain. Overflow and spills must be diverted away from storm drains or surface waters.
- Storage areas shall be free from weeds, debris, and other combustible materials.
- Outdoor portable tanks shall be provided with emergency vent devices and shall not be closer than 20 feet (6.1 meters) to any building.
- Signs indicating no smoking shall be posted around the storage area.

8.2.4 Storage of Hazardous Waste

- All facilities storing ignitable and combustible liquids and hazardous wastes must be designed, constructed, maintained, and operated to minimize the possibility of a fire, explosion, or any release of hazardous constituents.
- Flammable wastes should be stored more than 50 feet from the property line.

8.3 Driving Safety

(Reference CH2M HSE Policy 205, Distracted Driving – Wireless Devices, Vehicle Safety Core Standard)

All CH2M employees are prohibited from using wireless devices while operating a motor vehicle when conducting company business regardless of the location or vehicle ownership and whether or not during regular working hours.

All CH2M contractors and subcontractors are prohibited from using wireless devices while operating a CH2M- or CH2M client-owned, leased, or rented motor vehicle, or while operating any other motor vehicle on the project site.

- Prohibited use includes the following:
 - Dialing or speed dialing
 - Using a hands-free or voice-recognition (blue tooth) device to dial or speed dial
 - Engaging in conversation or listening to a conversation using a wireless device

- Checking e-mails or surfing the Internet using a wireless device
- Texting or e-mailing (reading, sending, or screening) with a wireless device
- Programming or entering coordinates into a global positioning system device (following directions by a global positioning system is permitted)
- Using a wireless device for voice recording or dictation
- Employees, contractors, and subcontractors who need to use a wireless device must pull off the road to a safe location, with the vehicle securely stopped and emergency flashers on, or wait until they reach their destination.
- Avoid distractions from mobile phones, smartphones, voice recognition systems, PDAs, notebook, tablets (or similar devices), or laptops, by turning off or silencing the wireless devices before operating a motor vehicle.

Follow the guidelines below when operating a vehicle:

- Obey speed limits, and be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you.
- Do not drive while drowsy. Drowsiness can occur at any time, but is most likely after 18 hours or more without sleep.
- Maintain focus on driving. Eating, drinking, smoking, and adjusting controls can divert attention from the road. Take the time to park and perform these tasks when parked rather than while driving.
- Ensure vehicle drivers are familiar with the safe operation of vehicles of the type and size to be operated. Large vehicles such as full-size vans and pick-ups have different vision challenges and handling characteristics than smaller vehicles.

8.4 Electrical Safety

(Reference CH2M SOP HSE-206, *Electrical Safety*)

Below are the hazard controls and safe work practices to follow when using electrical tools, extension cords, and/or other electrical-powered equipment or when exposed to electrical hazards. Ensure the requirements of the referenced SOP are followed:

- Only qualified personnel are permitted to work on unprotected energized electrical systems.
- Only authorized personnel are permitted to enter high-voltage areas.
- CH2M employees who might from time to time work in an environment influenced by the presence of electrical energy must complete Awareness Level Electrical Safety Training located on the CH2M Virtual Office.
- Do not tamper with electrical wiring and equipment unless qualified to do so. All electrical wiring and equipment must be considered energized until lockout/tagout procedures are implemented.
- Inspect electrical equipment, power tools, and extension cords for damage prior to use. Do not use defective electrical equipment; remove from service.
- CH2M has selected ground fault circuit interrupters (GFCIs) as the standard method for protecting employees from the hazards associated with electric shock:
 - GFCIs shall be used on all 120-volt, single-phase 15- and 20-ampere receptacle outlets that are not part of the permanent wiring of the building or structure.
- An assured equipment grounding conductor program may be required under the following scenarios:
 - GFCIs cannot be used

- Client requires such a program to be implemented
 - Business group decides to implement program in addition to GFCI protection
- Extension cords must be equipped with third-wire grounding. Cords passing through work areas must be covered, elevated, or protected from damage. Cords should not be routed through doorways unless protected from pinching. Cords should not be fastened with staples, hung from nails, or suspended with wire.
- Electrical power tools and equipment must be effectively grounded or double-insulated and Underwriters Laboratory approved.
- Operate and maintain electric power tools and equipment according to manufacturers' instructions.
- Maintain safe clearance distances between overhead power lines and any electrical conducting material unless the power lines have been de-energized and grounded, or where insulating barriers have been installed to prevent physical contact. Maintain at least 10 feet (3 meters) from overhead power lines for voltages of 50 kilovolts (kV) or less, and 10 feet (3 meters) plus 0.4 inch (1.0 centimeter) for every 1 kV over 50 kV.
- Temporary lights shall not be suspended by their electric cord unless designed for suspension. Lights shall be protected from accidental contact or breakage.
- Protect all electrical equipment, tools, switches, and outlets from environmental elements.

8.5 Field Vehicles

- Field vehicles may be personal vehicles, rental vehicles, fleet vehicles, or project vehicles.
- Maintain a first-aid kit, bloodborne pathogen kit, and fire extinguisher in the field vehicle at all times.
- Use a rotary beacon on vehicle if working adjacent to active roadway.
- Familiarize yourself with the following rental vehicle features prior to operating the vehicle:
 - Vision fields and blind spots
 - Vehicle size
 - Mirror adjustments
 - Seat adjustments
 - Cruise control features, if offered
 - Pre-program radio stations and global positioning system, if equipped
- Always wear seatbelt while operating vehicle.
- Adjust headrest to proper position.
- Tie down loose items if utilizing a van or pick-up truck.
- Close car doors slowly and carefully. Fingers can get pinched in doors.
- Park vehicle in a location where it can be accessed easily in the event of an emergency. If not possible, carry a phone.
- Have a designated place for storing the field vehicle keys when not in use.
- Ensure back-up alarms are functioning, if equipped. Before backing a vehicle, take a walk around the vehicle to identify obstructions or hazards. Use a spotter when necessary to back into or out of an area.
- See the Vehicle Accident Guidance attached to this SSHP, if a vehicle incident is experienced in a rental or fleet vehicle.

8.6 Fire Prevention

(Reference EM 385-1-1 Section 09.A.01, and CH2M SOP HSE-403, *Hazardous Material Handling*)

Follow the fire prevention and control procedures listed in the following subsection.

8.6.1 Fire Extinguishers and General Fire Prevention Practices

- Fire extinguishers shall be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 feet (30.5 meters). When 5 gallons (19 liters) or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 feet (15.2 meters). When 10 liters or more of a flammable or combustible liquid is being used, an extinguisher must be within 15 meters.
- Extinguishers must:
 - Be maintained in a fully charged and operable condition
 - Be visually inspected each month
 - Undergo a maintenance check each year
- The area in front of extinguishers must be kept clear.
- Post “Exit” signs over exiting doors, and post “Fire Extinguisher” signs over extinguisher locations.
- Combustible materials stored outside should be at least 10 feet (3 meters) from any building.
- Solvent waste and oily rags must be kept in a fire resistant, covered container until removed from the site.
- Keep areas neat. Housekeeping is important.
- A fire extinguisher, rated not less than 2A, shall be provided for each 280 square meters of a combustible building area, or major fraction thereof. Travel distance from any point of the protection area to the nearest fire extinguisher shall not exceed a horizontal distance of 50 feet or 15 meters.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

Fire extinguishers can represent an important segment of any overall fire protection program. However, their successful functioning depends upon the following conditions having been met:

- The extinguisher is properly located and in working order.
- The extinguisher is of proper type and for a fire which may occur.
- The fire is discovered while still small enough for the extinguisher to be effective.
- The fire is discovered by a person ready, willing, and able to use the extinguisher.
- Class C fires (see below for fire classifications) can be readily extinguished by quenching-cooling with water or a water-mixture agent. Class B fires are more effectively extinguished by an agent that blankets-smothers the fire through exclusion of oxygen surrounding the fire area. Those extinguishers containing bromochlorodifluoromethane, monobromotrifluoromethane, carbon dioxide, or dry chemical are generally best suited for extinguishing Class B fires. For Class C fires, the primary consideration in extinguishing this type of fire is the selection of nonconductive extinguishing agent to prevent dangerous electrical shock and possible death to user.
- Because of its corrosive nature, dry chemical is not recommended for use on computerized, electronic, or other equipment with extensive circuitry.

- The following chart defines/explains classes of fires:

A		Common Combustibles	Wood, paper, cloth etc.
B		Flammable liquids and gases	Gasoline, propane and solvents
C		Live electrical equipment	Computers, fax machines (see note!)
D		Combustible metals	Magnesium, lithium, titanium
K		Cooking media	Cooking oils and fats

Fires are classified into five groups:

- Class A: Class A fires involve common combustibles such as wood, paper, cloth, rubber, trash, and plastics. They are common in typical commercial and home settings, but can occur anywhere these types of materials are found.
- Class B: Class B fires involve flammable liquids, gases, solvents, oil, gasoline, paint, lacquers, tars, and other synthetic or oil-based products. Class B fires often spread rapidly and, unless properly secured, can reflash after the flames are extinguished.
- Class C: Class C fires involve energized electrical equipment, such as wiring, controls, motors, data processing panels, or appliances. They can be caused by a spark, power surge, or short circuit and typically occur in locations that are difficult to reach and see.
- Class D: Class D fires involve combustible metals such as magnesium and sodium. Combustible metal fires are unique industrial hazards that require special dry powder agents.

(NOTE: Although ABC and BC dry chemical extinguishers can control a fire involving electronic equipment, the National Fire Code specifically advises against dry-chemical extinguishers for fires involving computers or other delicate electronic equipment due to the potential damage from residues).

Firefighting shall only be conducted by those trained and certified in this practice. The commonly accepted practice is the PASS method. This means, pull the pin, aim, squeeze the handle, and sweep the base of the fire area. The SSHO shall verify that at least two staff members are onsite that have the required training for use of fire extinguishers.

8.6.2 Dispensing of Flammable/Combustible Liquids

- Areas in which flammable or combustible liquids are dispensed in quantities greater than 5 gallons (22.7 liters) (shall be separated from other operations by at least 25 feet (7.6 meters).
- Drainage away from storm drains or surface waters or other means of containment shall be provided to control spills.
- Adequate natural or mechanical ventilation shall be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.
- Dispensing of flammable liquids from one container to another shall be done only when containers are electrically interconnected (bonded).
- Dispensing flammable or combustible liquids by means of air pressure on the container or portable tanks is prohibited.
- Dispensing devices and nozzles for flammable liquids shall be of an approved type.

8.7 General Practices and Housekeeping

The following are general requirements applicable to all portions of the work:

- Site work should be performed during daylight hours whenever possible.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel should be established and kept free from the accumulation of materials.
- Keep access to aisles, exits, ladders, stairways, scaffolding, and emergency equipment free from obstructions.
- Provide slip-resistant surfaces, ropes, or other devices to be used.
- Specific areas should be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers should be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up; oil and grease shall be cleaned from walking and working surfaces.
- Review the safety requirements of each job you are assigned to with your supervisor. You are not expected to perform a job that may result in injury or illness to yourself or to others.
- Familiarize yourself with, understand, and follow jobsite emergency procedures.
- Do not fight or horseplay while conducting the firm's business.
- Do not use or possess firearms or other weapons while conducting the firm's business.
- Report unsafe conditions or unsafe acts to your supervisor immediately.
- Report emergencies, occupational illnesses, injuries, vehicle accidents, and near misses immediately.
- Do not remove or make ineffective safeguards or safety devices attached to any piece of equipment.
- Report unsafe equipment, defective or frayed electrical cords, and unguarded machinery to your supervisor.
- Shut down and lock out machinery and equipment before cleaning, adjustment, or repair. Do not lubricate or repair moving parts of machinery while the parts are in motion.
- Do not run in the workplace.
- When ascending or descending stairways, use the handrail and take one step at a time.
- Do not apply compressed air to any person or clothing.
- Do not wear steel taps or shoes with metal exposed to the sole at any CH2M project location.
- Do not wear finger rings, loose clothing, wristwatches, and other loose accessories when within arm's reach of moving machinery.
- Remove waste and debris from the workplace and dispose of in accordance with federal, state, and local regulations.
- Note the correct way to lift heavy objects (secure footing, firm grip, straight back, lift with legs), and get help if needed. Use mechanical lifting devices whenever possible.
- Check the work area to determine what problems or hazards may exist.

8.8 Hazard Communication

(Reference Section 01.B.06, EM 385-1-1 and CH2M SOPs HSE-107, *Hazard Communication* and HSE-403, *Hazardous Material Handling*)

The hazard communication coordinator is to perform the following:

- Effective information and training on hazardous chemicals shall be given to project employees by their employer at the time of initial assignment and/or whenever a new physical or health hazard the employees have not been previously trained about is introduced into their work area.
- Complete an inventory of chemicals brought onsite by CH2M using the chemical inventory form included as an attachment to this SSHP.
- Confirm that an inventory of chemicals brought onsite by CH2M subcontractors is available.
- Request or confirm locations of material safety data sheets (MSDSs) from the client, contractors, and subcontractors for chemicals to which CH2M employees potentially are exposed.
- Before or as the chemicals arrive onsite, obtain an MSDS for each hazardous chemical and include on the chemical inventory sheet (attached to this SSHP) and add the MSDS to the MSDS attachment section of this plan.
- Label chemical containers with the chemical name and with hazard warnings, and store properly.
- Give employees required chemical-specific hazardous communication training using the chemical-specific training form included as an attachment to this SSHP.
- Store all materials properly, giving consideration to compatibility, quantity limits, secondary containment, fire prevention, and environmental conditions.

8.9 Knife Use

Open-bladed knives (for example, box cutters, utility knives, pocket knives, machetes, and multi-purpose tools with fixed blades such as a Leatherman™) are prohibited at worksites, except where the following three conditions are met:

- The open-bladed knife is determined to be the best tool for the job.
- An approved AHA or written procedure is in place and covers the necessary safety precautions (work practices, PPE, and training).
- Knife users have been trained and follow the AHA.

8.10 Lighting

Lighting shall be evaluated when conducting work inside buildings, confined spaces, or other areas/instances where supplemental light may be needed (for example, work before sunrise or after sunset). A light meter can be used to evaluate the adequacy of lighting. The following are common requirements for lighting and the conditions/type of work being performed:

- While work is in progress outside construction, areas shall have at least 33 lux.
- Construction work conducted inside buildings should be provided with at least 55 lux light.
- The means of egress shall be illuminated with emergency and non-emergency lighting to provide a minimum 11 lux measured at the floor. Egress illumination shall be arranged so that the failure of any single lighting unit, including the burning out of an electric bulb, will not leave any area in total darkness.

8.11 Manual Lifting

(Reference CH2M SOP HSE-112, *Manual Lifting*)

Back injuries are the leading cause of disabling work and most back injuries are the result of improper lifting techniques or overexertion. Use the following to mitigate the hazards associated with lifting:

- When possible, the task should be modified to minimize manual lifting hazards.
- Lifting of loads weighing more than 40 pounds (18 kilograms) shall be evaluated by the SC using the Lifting Evaluation Form contained in SOP HSE-112.
- Using mechanical lifting devices is the preferred means of lifting heavy objects such as forklifts; cranes, hoists, and rigging; hand trucks; and trolleys.
- Personnel shall seek assistance when performing manual lifting tasks that appear beyond their physical capabilities.
- In general, the following steps must be practiced when planning and performing manual lifts: Assess the situation before you lift; ensure good lifting and body positioning practices; and ensure good carrying and setting down practices.
- All CH2M workers must have training in proper manual lifting training either through the New Employee Orientation or through Manual Lifting module located on the Virtual Office.

8.12 Personal Hygiene

Good hygiene is essential for personal health and to reduce the potential of cross-contamination when working on a hazardous waste site. Implement the following:

- Keep hands away from nose, mouth, and eyes during work.
- Keep areas of broken skin (chapped, burned, etc.) covered.
- Wash hands with soap and water prior to eating, smoking, or applying cosmetics.

8.13 Personal Security

Follow the guidelines below for personal security measures. The RHSM and Firm-Wide Security Office can be contacted if additional, specific measures are needed (such as evaluating the needs for security service).

8.13.1 General Safety and Security Guidelines

The CH2M Corporate Security Department recommends the following guidelines for workers in the United States:

- Stay alert and be aware of your surroundings. Avoid pre-occupations with mobile devices, while in an unfamiliar area.
- Whenever possible, use the buddy system with another employee or client or subcontractor employee.
- Trust your intuition; if a situation appears strange or wrong, it probably is.
- Be confident in your walk or stride; do not give the appearance you are new in town.
- Avoid carrying and displaying large sums of cash.
- If you sense or see dangerous situations along your route, change your route and depart the area quickly. If you feel that you are being followed, go to the nearest police station or safe location and file a complaint with the police. Provide a description of the person, their vehicle, license plate number, and any other useful information.
- Only walk short distances that are safe and secure while visiting an unfamiliar city or location.
- Take host-approved transportation for long distances.

- “Fight or Flight?” Leaving the possible or dangerous area is always better than staying to fight.
- Always report suspicious activity to the nearest local law enforcement agency.
- Locate emergency exits in your hotel or where you are staying to ensure you know where to go in case of a fire or a natural or manmade disaster.
- Secure your electronic devices when left in your room or take them with you if you are not able to secure them properly.
- If you feel your life is in danger, call 911. Be sure to speak clearly, concisely, and give the dispatcher a good description of where you are physically located.

8.13.2 Operating or Riding in Vehicles

- When waiting for public transportation or a taxi, remain in a store or restaurant as long as possible before catching your ride and never wait by yourself in an isolated area.
- Approach your vehicle with keys firmly in your hand and ready to unlock the car.
- Quickly check your car before entering it to determine damage or presence of an intruder.
- Vulnerable times can be stopping to find your keys to enter your vehicle or stepping out of your vehicle in an isolated area. Be aware of your surroundings before you perform these activities.
- Always keep your doors locked during transit and when the vehicle is parked.
- Never leave your vehicle unlocked, even when performing a quick task such as checking in at a hotel, getting gas, or going picking up food.
- If confronted by an individual inside a vehicle pointing a weapon at you, run the opposite way from where the vehicle is facing and scream as loud as you can. This evasive action will probably cause the individual to drive away.
- If an individual in a passing car points at your tires or engine to indicate a malfunction, only pull over in a well-lit and populated gas or rest stop. Never pull over in an isolated or dimly lit area. You may have a malfunction or the passing motorist may be attempting to rob you.
- Always park your vehicle in a well-lit and secure area. If your vehicle is parked in a dimly lit or isolated area in a parking garage; ask an attendant or friend to accompany you to your vehicle.
- Secure your valuables in the trunk, or place them out of sight or cover them with a blanket or coat if there is no secure storage area in the vehicle. The would-be-perpetrator likes to see what to steal and not knowing what you have concealed will normally prevent a break in.

8.13.2.1 Riding in a Taxi

- Have your host or a designated travel agent suggest or reserve a reputable taxi service for you during your stay.
- Only use a taxi service that was vetted for safety and reliability.
- If possible, place luggage, laptop, and personal belongings inside the taxi.
- When you first enter the taxi, check the driver’s photo identification card, normally located on the driver’s visor, with the driver to ensure they match.

8.13.2.2 Walking

- If you experience automotive trouble, remain inside the locked vehicle and call for assistance.
- If you cannot reach assistance through a mobile phone, only walk for help in a safe area facing the traffic.
- If while walking you are shadowed or followed by a vehicle, run back in the direction of your vehicle and enter the vehicle if possible. File a police report on the incident as soon as practicable.

- Be aware of your surroundings and those around you while walking, and do not be distracted by using electronic devices.
- Regularly change your route if you are walking to and from meetings or conferences, and choose only well-lit areas in which to walk at night.
- If walking long distances, identify a safe house, shop, store, or restaurant to duck into if confronted by a perpetrator.

8.13.2.3 Jogging or Running

- Always jog or run in an area that is safe, secure, and used for exercising.
- Avoid running along busy roads or highways.
- If you choose to venture out on a jog or run, check the route by vehicle prior to beginning to exercise.
- Let the host or a friend know when you leave, when you plan to return, and the route you will take during exercising.
- Take a photo identification and mobile phone with you for emergencies.
- Avoid physically over-extending yourself since reflexes and decision making ability can be impaired.

8.13.2.4 Clothing and Jewelry

- Dress to blend in with locals, maintain a low profile, and avoid drawing attention to yourself.
- Travel with inexpensive clothing and jewelry.
- Avoid wearing CH2M distinctive clothing or using CH2M logos on luggage or laptops.

8.13.2.5 Emergency Numbers and Information

- Leave your itinerary and emergency contact numbers where you can be reached with family members and only those that have a need to know.
- Pre-program emergency numbers in the mobile device you are traveling with.
- Carry a list of current medications and specific doses in your purse or wallet.
- Record medical emergency information on a document that can be readily available if you are unable to speak or unconscious.
- Have a photocopy of your driver's license, passport, and credit card information separately in case your wallet or purse is stolen.

8.14 Shipping and Transportation of Hazardous Materials

(Reference CH2M SOP HSE-417, *Hazardous Materials Transportation*)

The U.S. Department of Transportation (DOT) has specific regulations governing shipping of hazardous materials (also called dangerous goods). Chemicals brought to the site might be defined as hazardous materials by the U.S. DOT. Hazardous wastes that may be shipped offsite are also defined as hazardous materials by U.S. DOT. Other wastes may also be U.S. DOT hazardous materials. To confirm whether a material or a waste is a U.S. DOT hazardous material, check with the ESBG Waste Coordinator (Lisa Schwan/ATL), the project EM, or the CH2M Dangerous Goods Shipping Coordinators (John Blasco/BAO or Rob Strehlow/MKW).

All staff who are involved in shipment of hazardous materials, including receiving hazardous materials, preparing profiles or manifests, packaging hazardous wastes, labeling, or transporting hazardous materials by road, are called HazMat employees (note CH2M cannot transport hazardous wastes by public road). HazMat employees must receive CH2M online training in shipping dangerous goods. CH2M's online Dangerous Goods Shipping course can be found on the HSSE area of the Virtual Office.

All hazardous materials that are shipped (for example, by Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. If the material is a product that is being shipped (for example, calibration gas), use the HazMat ShipRight tool on the CH2M Virtual Office (under Company Resources – Online Shipping). Contact the Dangerous Goods Shipping coordinators, the ESG Waste Coordinator, or the project EM for additional information.

49 CFR 172 requires that all hazmat employees be aware of potential transportation security concerns. Hazardous materials security is addressed in CH2M's Hazardous Materials SOP (HSE-403). The following points are provided as an overview of security measures to increase awareness of this important matter:

- It is essential that each employee understand the security risks involved with transporting hazardous materials.
- All transporters of hazardous materials must be prequalified by a contract administrator who evaluates the carrier's safety rating, security measures, and employee screening procedures.
- When shipping hazardous materials, check driver's credentials and ask about shipping details.
- When receiving a hazardous materials shipment, inspect packages for signs of tampering or damage to the contents. Verify the drivers and company information on the form with the driver.
- If there is suspicious or unusual behavior (for example, driver without credentials, evasive answers) or any discrepancies identified, do not offer or accept the shipment, and immediately notify the PM or the RHSM.

Employees responsible for shipping hazard materials must also review the CH2M Transportation Security Plan (HSE-417 Appendix A).

8.15 Substance Abuse

(Reference CH2M SOP HSE-105, *Drug-Free Workplace*)

Employees who work under the influence of controlled substances, drugs, or alcohol may prove to be dangerous or otherwise harmful to themselves, other employees, clients, the company, the company's assets and interests, or the public. CH2M does not tolerate illegal drug use, or any use of drugs, controlled substances, or alcohol that impairs an employee's work performance or behavior.

Prohibitions onsite include the following:

- Use or possession of intoxicating beverages while performing CH2M work.
- Abuse of prescription or nonprescription drugs.
- Use or possession of illegal drugs or drugs obtained illegally.
- Sale, purchase, or transfer of legal, illegal, or illegally obtained drugs.
- Arrival at work under the influence of legal or illegal drugs or alcohol.

Drug and/or alcohol testing is applicable under CH2M Constructors, Inc., and munitions response projects performed in the United States. In addition, employees may be required to submit to drug and/or alcohol testing as required by clients. When required, the testing is performed in accordance with SOP HSE-105, *Drug-Free Workplace*. Employees who are enrolled in drug or alcohol testing are required to complete annual training located on the CH2M Virtual Office.

8.16 Unknown or Suspect Objects/Materials

If unknown or suspect objects/materials are encountered (that is, exposed or partially buried drums, biological waste, cylinders, munitions of explosive concern, and unexpected stained/discolored soil) are encountered during site operations, ongoing activities shall be immediately suspended. CH2M or subcontractor personnel encountering unknown or suspect objects/materials shall adhere to the following:

- Secure the area and identify the location of the object/material to the extent possible, without causing bodily injury to yourself or others and without disturbing the object.

- Evacuate the work area.
- Immediately notify the PM/HSM of the encountered condition.
- Do not provide additional disturbance or otherwise handle the suspect object/material.

The site supervisor or SC shall contact the PM and the Health and Safety Manager (HSM) to evaluate potential hazards associated with the specific situation encountered. The project team will then address the need for the use of special procedures, engineering controls, PPE, or specialized subcontract personnel to safely mitigate the situation.

Project-specific Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. The practices and controls are to be implemented by the party in control of either the work or the particular hazard. Each person onsite is required to abide by the hazard controls. Always consult the appropriate CH2M SOP to ensure all requirements are implemented. CH2M employees and subcontractors must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. CH2M employees and subcontractors who do not understand any of these provisions should contact the RHSM for clarification.

9.1 Blasting/Explosives

(Reference CH2M SOP HSE-610, Explosives Usage and Munitions Response)

- A (safety) Opportunity Risk Evaluation (ORE) must be conducted with the Munitions Response (MR) Safety/Quality Officer prior to the Go/No Go decision making opportunity for all projects involving the use of explosives or work to be performed on a MR site.
- Only authorized, trained, and qualified personnel shall handle, use, and transfer explosives.
- Blasting subcontractors are responsible for providing a competent person to oversee blasting operations.
- Personnel who will be handling explosives will not wear outer or inner garments having static electricity-generating characteristics, including clothing made of 100 percent polyester, nylon, silk, and wool, which are all highly static-producing.
- Protective shoes worn by personnel performing explosives operations should be constructed of nonferrous materials (for example, fiberglass) to prevent interference with sensitive geophysical instruments.
- Expose the minimum number of people to the minimum amount of explosives for the minimum amount of time. Project-specific explosives safety precautions shall be developed prior to field activities and must be reviewed and approved by the MR Safety/Quality Officer and the MR Operations Manager.
- Details of explosives management and safety requirements are developed and included in a site-specific Explosives Management Plan.
- Security of explosives shall conform to the requirements set forth by federal, state, and local jurisdictions. Project site and overnight explosives security will conform to 49 CFR 171-173, transportation security requirements.
- **Type 20 Manufacturer of High Explosives License/Permit** issued by the Bureau of Alcohol, Tobacco, Firearms and Explosives (BATFE) is required to purchase, store, and use high explosives including onsite use of binary explosives in support of MR operations, construction projects, and demolition and deactivation projects.
- State and local explosives permits may be required for CH2M and individuals to purchase, store, and use explosives in support of MR operations, controlled detonation chamber operations, construction projects, and demolition and deactivation projects. In addition, there may be local requirements to notify law enforcement or fire department agencies when establishing explosives storage.

9.2 Earthmoving Equipment

(Reference CH2M, SOP HSE-306, *Earthmoving Equipment*)

The following are the hazard controls and safe work practices to follow when working around or operating heavy equipment. Ensure the requirements in the referenced SOP are followed.

- CH2M authorizes only those employees qualified by training or previous experience to operate material handling equipment.

- CH2M employees must be evaluated prior to operating earthmoving equipment by a CH2M earthmoving equipment operator evaluation designated person. This evaluation will be documented according to SOP HSE-306, Earthmoving Equipment.
- Heavy equipment operators are prohibited from using any wireless device while operating equipment. Equipment must be stopped before using devices such as two way radios or cell phones.
- Equipment must be checked at the beginning of each shift to ensure the equipment is in safe operating condition and free of apparent damage. The check should include service brakes, parking brakes, emergency brakes, tires, horn, back-up alarm, steering mechanism, coupling devices, seat belts, and operating controls. Defects shall be corrected before the equipment is placed in service. Documentation of this inspection must be maintained onsite at all times (use the Earthmoving Equipment Inspection form if operated by CH2M).
- Equipment must be on a stable foundation such as solid ground or cribbing; outriggers are to be fully extended.
- Equipment must not be used to lift personnel; loads must not be lifted over the heads of personnel.
- Equipment, or parts thereof, which are suspended must be substantially blocked or cribbed to prevent shifting before personnel are permitted to work under or between them. All controls shall be in a neutral position, with the motors stopped and brakes set.
- Equipment which is operating in reverse must have a reverse signal alarm distinguishable from the surrounding noise or a signal person when the operators view is obstructed.
- When equipment is used near energized power lines, the closest part of the equipment must be at least 10 feet (3 meters) from the power lines less than 50 kV. Provide an additional 4 feet (1.2 meters) for every 10 kV over 50 kV. A person must be designated to observe clearances and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. All overhead power lines must be considered to be an energized until the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.
- Underground utility lines must be located before excavation begins; refer to the Utilities (underground) section.
- Operators loading and unloading from vehicles are responsible for seeing that vehicle drivers are in the vehicle cab or in a safe area.
- The parking brake shall be set whenever equipment is parked; wheels must be chocked when parked on inclines.
- When not in operation, the blade or bucket must be blocked or grounded; the master clutch must be disengaged when the operator leaves the cab. When equipment is unattended, power must be shut off, brakes set, blades or buckets landed and shift lever in neutral.

9.3 Excavation Activities

(Reference CH2M SOP HSE-307, *Excavation and Trenching Safety*)

The requirements in Section 9.2 shall be followed whenever excavation is being performed. Refer to the Earthmoving Equipment section and SOP for additional requirements applicable to operating/oversight of earthmoving equipment. Below are the hazard controls and safe work practices to follow when working around or performing excavation. Ensure the requirements in the referenced SOP are followed. All excavation work must be conducted under the control of an excavation competent person that meets the knowledge, training, and experience requirements of Section 25 of EM 385-1-1 and 29 CFR 1926.

- If the project site is suspected of MECs contamination, requirements of the *Explosives Usage and Munitions Response (MR)* SOP HSE-610 shall be followed. MECs include unexploded ordnance (UXO), discarded military

munitions, materials that present a potential explosive hazard, chemical warfare materials, munitions constituents, and contaminated soil or groundwater. Downhole avoidance support may be required to prevent accidental contact with UXO. Safety requirements will be based on the risk assessment identified within the MR (safety) ORE.

- Do not enter the excavations unless completely necessary, and only after the excavation competent person has completed their daily inspection and has authorized entry. An inspection shall be conducted by the competent person prior to the start of work, as needed throughout the shift, after every rainstorm, and after any hazard increasing occurrence. Documentation of the inspection must be maintained onsite at all times.
- Follow all excavation entry requirements established by the excavation competent person and any excavation permit being used.
- Sloping, benching, shoring, shielding, or other protective systems are required to protect personnel from cave-ins except when the excavation is made entirely in stable rock or is less than 5 feet deep (1.5 meters) and there is no indication of possible cave-in, as determined by the excavation competent person. Protective systems for excavations deeper than 20 feet (6.1 meters) must be designed or approved by a registered professional engineer.
- Trenches greater than 4 feet (1.2 meters) deep shall be provided with a ladder, stairway, or ramp positioned so that the maximum lateral travel distance is no more than 25 feet (7.6 meters).
- The atmosphere of excavations greater than 4 feet (1.2 meters) deep shall be tested prior to entry when a hazardous atmosphere exists or could reasonably be expected to exist, such as excavating landfills, hazardous waste dumps; or areas containing sewer or gas utility systems, petroleum distillates, or areas where hazardous substances are stored nearby.
- Spoil piles, material, and equipment must be kept at least 2 feet (61 centimeters) from the edge of the excavation, or a retaining device must be used to prevent the material from falling into the excavation.
- Excavations shall not be entered when the following conditions exist:
 - Protective systems are damaged or unstable
 - Objects or structures above the work location may become unstable and fall into the excavation
 - The potential for a hazardous atmosphere exists, unless the air has been tested and found to be at safe levels
 - Accumulated water exists in the excavation, unless precautions have been taken to prevent excavation cave-in

The excavation self-assessment checklist shall be used to evaluate excavations prior to entry.

9.4 Hand and Power Tools

(Reference CH2M, SOP HSE-210, *Hand and Power Tools*)

The following are the hazard controls and safe work practices to follow when personnel or subcontractors are using hand and power tools. Ensure the requirements in the referenced SOP are followed:

- Tools shall be inspected prior to use and damaged tools will be tagged and removed from service.
- Hand tools will be used for their intended use and operated in accordance with manufacturer's instructions and design limitations.
- Maintain all hand and power tools in a safe condition.
- Use PPE (such as gloves, safety glasses, earplugs, and face shields) when exposed to a hazard from a tool.
- Do not carry or lower a power tool by its cord or hose.

- Portable power tools will be plugged into GFCI protected outlets.
- Portable power tools will be Underwriters Laboratories listed and have a three-wire grounded plug or be double insulated.
- Disconnect tools from energy sources when they are not in use, before servicing and cleaning them, and when changing accessories (such as blades, bits, and cutters).
- Safety guards on tools must remain installed while the tool is in use and must be promptly replaced after repair or maintenance has been performed.
- Store tools properly in a place where they will not be damaged or come in contact with hazardous materials.
- If a cordless tool is connected to its recharge unit, both pieces of equipment must conform strictly with electrical standards and manufacturer's specifications.
- Tools used in an explosive environment must be rated for work in that environment (that is, intrinsically safe, spark-proof, etc.).
- Working with manual and pistol-grip hand tools may involve highly repetitive movement, extended elevation, constrained postures, and/or awkward positioning of body members (for example, hand, wrist, arm, shoulder, neck, etc.). Consider alternative tool designs, improved posture, the selection of appropriate materials, changing work organization, and sequencing to prevent muscular, skeletal, repetitive motion, and cumulative trauma stressors.

9.4.1 Machine Guarding

- Ensure all machine guards are in place to prevent contact with drive lines, belts, chains, pinch points, or any other sources of mechanical injury.
- Unplugging jammed equipment will only be performed when equipment has been shut down, all sources of energy have been isolated and equipment has been locked/tagged and tested.
- Maintenance and repair of equipment that results in the removal of guards or would otherwise put anyone at risk requires lockout of that equipment prior to work.

9.5 Munitions and Explosives of Concern and/or Material Potentially Presenting an Explosive Hazard

9.5.1 Hazard Identification

The nature of activities on this project will result in the potential of encountering MEC and MPPEH items that have been fired, disposed, or abandoned, but may still represent a hazard. Non-UXO trained personnel will avoid all contact with MEC/MPPEH.

9.5.2 Hazard Mitigation/Prevention

All field personnel will be given munitions recognition training prior to working on the site. The training will be verified by signature on the site training form. Personnel will be instructed to be alert for MEC/MPPEH. The following general precautions concerning suspect MEC will be observed at all times:

- Suspect MEC item(s) WILL NOT be touched or moved regardless of the markings or apparent condition. Only UXO trained personnel are allowed to handle MEC/MPPEH.
- Radios or cellular phones WILL NOT be used in the vicinity of suspect MEC items.
- Areas where the ground cannot be seen WILL NOT be traveled across without escort.
- Vehicles WILL NOT be driven into suspected MEC areas; clearly marked lanes will be used.
- Matches, cigarettes, lighters, or other flame-producing devices WILL NOT be carried on to a munitions response site (MRS).

- Color codes WILL NOT be relied upon for positive identification of MEC items or their contents.
- Suspect MEC items will be approached from the side whenever possible; approaching the front or rear areas will be avoided.
- Personnel will always assume that a MEC item contains a live charge until it can be determined otherwise.
- Earth moving equipment (EME) operations within an exclusion zone (EZ) will be performed under the supervision of a UXO Technician III.
- EME will not be used to excavate soils within 12 inches of an anomaly.
- Anomaly investigation personnel are not permitted to enter an excavation greater than four feet in depth. If an investigation needs to be performed in an excavation deeper than four feet, operations at that work area will be halted and the SSHO will be notified. If further investigation is warranted, the SSHO will notify the HSM to determine the appropriate safety measures (e.g. sloping, shoring, etc.) to be implemented. The implementation of excavation safety provisions will require an amendment to this APP/SSHP.
- When anomaly investigation personnel must be in the area of EME:
 - Sufficient separation between ground support personnel and operating EME must be maintained.
 - Wear reflective vests or high visibility clothing to promote visibility of ground personnel by equipment operators.
 - Isolate equipment swing areas from workers, fixed objects or other equipment. Ground personnel shall avoid positioning themselves between fixed object and operating equipment.
 - Make/maintain eye contact with operators before approaching equipment. Do not approach equipment from rear or from blind spot of operator. Stay out of the swing radius of operating heavy equipment.
 - Suspended loads shall not be passed over ground personnel and ground personnel shall not walk under or in front of suspended loads.

The following actions will be taken if munitions are found:

- Personnel who are not UXO-qualified will note the area of concern, and leave the immediate vicinity. They WILL NOT touch, move, or otherwise disturb the item.
- Personnel should not be misled by markings on the munitions item stating or indicating that the item is a practice bomb or inert. Even practice bombs may have explosive charges that are used to mark/spot the point of impact, or the item could be incorrectly marked.
- Immediately upon locating any suspect MEC, the Senior UXO Supervisor (SUXOS) and UXO Safety Officer (UXOSO) will be notified. In turn, the SUXOS will notify the PM who will then provide required notifications to the client.
- Operations in the immediate area of the suspect MEC will be halted and the appropriate procedures (as described below) will be implemented.

Removal and disposal of MEC is part of this scope of work and will be undertaken by a MEC support contractor under the oversight of CH2M UXO qualified personnel. MEC will be consolidated, demilitarized, and disposed of in accordance with procedures outline in the approved Work Plan and Explosives Safety Submission (ESS).

When MEC is detected and identified as potentially loaded with explosives, chemicals, propellant or pyrotechnics, or when a buried object is exposed and cannot be identified as non-MEC, the MEC support contractor will coordinate with the CH2M SUXOS for assistance. The location of the object will be marked with a survey marker flag and all investigation activities at that location will cease. The MEC support contractor will maintain site access control and ensure personnel safety until Explosive Ordnance Disposal (EOD) personnel arrive and take control of the site. The contractor must supply the global positioning system (GPS) coordinates for each item upon arrival of the Emergency Response Team. The GPS positions must also be noted in the final report. The contractor will allow

the Government EOD personnel sufficient time to complete field evaluation, render safe, recover and dispose of MEC, per incident, when MEC that cannot be identified is detected.

9.5.3 MEC Avoidance Activities

MEC avoidance is required for several of the activities required by this scope of work. MEC avoidance activities may include visual observation of the ground surface by a UXO technician prior to and during non-intrusive tasks. When the ground is obstructed and as required, a UXO technician may augment the visual inspection with a handheld magnetometer (Schonsted Ga-52Cx, White XLT, or equivalent). The SOP for MEC avoidance will be followed.

9.6 Stairways and Ladders

(Reference CH2M SOP HSE-214, *Stairways and Ladders*)

Below are the hazard controls and safe work practices to follow when using stairways and ladders. Ensure the requirements in the referenced SOP are followed.

- Stairway or ladder is generally required when a break in elevation of 19 inches (48.3 centimeters) or greater exists.
- Personnel should avoid using both hands to carry objects while on stairways; if unavoidable, use extra precautions.
- Personnel must not use pan and skeleton metal stairs until permanent or temporary treads and landings are provided the full width and depth of each step and landing.
- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Always obey and pay attention to warning labels or stickers on the specific ladder being used.
- Ladders must be used only for the purpose for which they were designed and shall not be loaded beyond their rated capacity.
- Ladder safety training on safe use (take the Stairways and Ladders safety training module located on the Virtual Office).
- Only one person at a time shall climb on or work from an individual ladder.
- User must face the ladder when climbing; keep belt buckle between side rails.
- Ladders shall not be moved, shifted, or extended while in use.
- User must use both hands to climb; use rope to raise and lower equipment and materials.
- Straight and extension ladders must be tied off to prevent displacement.
- Ladders that may be displaced by work activities or traffic must be secured or barricaded.
- Personnel climbing ladders shall face the ladder and maintain 3 points of contact with the ladder.
- Portable ladders must extend at least 3 feet (91.5 centimeter) above landing surface.
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder.
- Stepladders are to be used in the fully opened and locked position.
- Users are not to stand on the top two steps of a stepladder; nor are users to sit on top or straddle a stepladder.

- Fixed ladders greater than or equal to 24 feet (7.3 meters) in height must be provided with fall protection devices.
- Fall protection should be considered when working from extension, straight, or fixed ladders greater than six feet (1.8 meters) from lower levels and both hands are needed to perform the work, or when reaching or working outside of the plane of ladder side rails.

9.7 Slips, Trips and Falls

9.7.1 General

- Institute and maintain good housekeeping practices.
- Designate foot traffic paths in and out of sites, when necessary, to ensure paths are kept free from slip, trip, and fall hazards or to deter personnel from taking “shortcuts” where slip, trip, hazards may be.
- Mitigate icy conditions by keeping foot traffic paths clear of ice and snow.
- Watch footing as you walk to avoid trip hazards, animal holes, or other obstacles, especially in tall grassy areas.

9.7.2 Muddy Conditions

- Muddy conditions present a slipping hazard. Use mats or other similar surface to work from if footing cannot be stabilized.
- Take shortened steps across muddy areas.
- Use a walking staff or other similar means to assist with balance.

9.7.3 Steep Slopes/Uneven Ground/Rock and Vertical Slopes

- Be aware that escarpments can slough. Avoid these areas.
- Exercise caution in relying on rocks and trees/tree stumps to support yourself—many times they are loose.
- Whenever possible, switchback your way up/down steep areas, and maintain a slow pace with firm footing.
- Employees walking in ditches, swales and other drainage structures adjacent to roads or across undeveloped land must use caution to prevent slips and falls which can result in twisted or sprained ankles, knees, and backs.
- Whenever possible observe the conditions from a flat surface and do not enter a steep ditch or side of a steep road bed.
- If steep terrain must be negotiated coordinate with RHSM to evaluate the need for ladders or ropes to provide stability.

9.8 Utilities (underground)

An assessment for underground utilities must be conducted where there is a potential to contact underground utilities or similar subsurface obstructions during intrusive activities. Intrusive activities include excavation, trenching, drilling, hand augering, soil sampling, or similar activities.

The assessment must be conducted before any intrusive subsurface activity and must include at least the following elements:

1. A background and records assessment of known utilities or other subsurface obstructions.
2. Contacting and using the designated local utility locating service.
3. Conducting an independent field survey to identify, locate, and mark potential underground utilities or subsurface obstructions. *Note: This is independent of, and in addition to, any utility survey conducted by the designated local utility locating service above.*

4. A visual survey of the area to validate the chosen location.

When any of these steps identifies an underground utility within 5 feet (1.5 meters) of intrusive work, then non-aggressive means must be used to physically locate the utility before a drill rig, backhoe, excavator or other aggressive method is used.

Aggressive methods are never allowed within 2 feet of an identified high-risk utility (see paragraph below).

Any deviation from these requirements must be approved by the RHSM and the PM.

9.8.1 Background and Records Assessment of Known Utilities

Identify any client- or location-specific permit and/or procedural requirements (for example, dig permit or intrusive work permit) for subsurface activities. For military installations, contact the Base Civil Engineer and obtain the appropriate form to begin the clearance process.

Obtain available utility diagrams and/or as-built drawings for the facility.

Review locations of possible subsurface utilities including sanitary and storm sewers, electrical lines, water supply lines, natural gas lines, fuel tanks and lines, communication lines, lighting protection systems, etc. Note: Use caution in relying on as-built drawings as they are rarely 100 percent accurate.

Request that a facility contact with knowledge of utility locations review and approve proposed locations of intrusive work.

9.8.2 Designated Local Utility Locating Service

Contact your designated local utility locating service (for example, Dig-Safe, Blue Stake, One Call) to identify and mark the location of utilities. Call 811 in the US or go to www.call811.com to identify the appropriate local service group. Contacting the local utility locating service is a legal requirement in most jurisdictions.

9.8.3 Independent Field Survey (Utility Locate)

The organization conducting the intrusive work (CH2M or subcontractor) shall arrange for an independent field survey to identify, locate, and mark any potential subsurface utilities in the work area. This survey is in addition to any utility survey conducted by the designated local utility-locating service.

The independent field survey provider shall determine the most appropriate instrumentation/technique or combinations of instrumentation/techniques to identify subsurface utilities based on their experience and expertise, types of utilities anticipated to be present, and specific site conditions.

A CH2M or subcontractor representative must be present during the independent field survey to observe the utility locate and verify that the work area and utilities have been properly identified and marked. If there is any question that the survey was not performed adequately or the individual was not qualified, then arrangements must be made to obtain a qualified utility locate service to re-survey the area. Obtain documentation of the survey and clearances in writing and signed by the party conducting the clearance. Maintain all documentation in the project file.

If the site owner (military installation or client) can provide the independent field survey, CH2M or the subcontractor shall ensure that the survey includes:

- Physically walking the area to verify the work location and identify, locate, and mark underground utility locations.
- Having qualified staff available and instrumentation to conduct the locate.
- Agreeing to document the survey and clearances in writing.
- Should any of the above criteria not be met, CH2M or subcontractor must arrange for an alternate independent utility locate service to perform the survey.
- The markings from utility surveys must be protected and preserved until the markings are no longer required. If the utility location markings are destroyed or removed before intrusive work commences or is completed,

the PM, SC, or designee must notify the independent utility locate service or the designated local utility locating service to resurvey and remark the area.

9.8.4 Visual Assessment before and during Intrusive Activities

Perform a “360 degree” assessment. Walk the area and inspect for utility-related items such as valve caps, previous linear cuts, patchwork in pavement, hydrants, manholes, utility vaults, drains, and vent risers in and around the dig area.

The visual survey shall include all surface landmarks, including manholes, previous liner cuts, patchwork in pavement, pad-mounted transformers, utility poles with risers, storm sewer drains, utility vaults, and fire hydrants.

If any unanticipated items are found, conduct further research before initiating intrusive activities and implement any actions needed to avoid striking the utility or obstruction.

9.8.5 Subsurface Activities within 5 feet of an Underground Utility or if there is Uncertainty

When aggressive intrusive activities will be conducted within 5 feet (1.5 meters) of an underground utility or when there is uncertainty about utility locations, locations must be physically verified by non-aggressive means such as air or water knifing, hand digging, or human powered hand augering. Non-conductive tools must be used if electrical hazards may be present. If intrusive activities are within 5 feet (1.5 meters) and parallel to a marked existing utility, the utility location must be exposed and verified by non-aggressive methods every 100 feet (30.5 meters). Check to see if the utility can be isolated during intrusive work.

9.8.5.1 Intrusive Activities within 2 feet of an Underground Utility

Use non-aggressive methods (hand digging, vacuum excavation, etc.) to perform intrusive activities within 2 feet of a high-risk utility (that is, a utility that cannot be de-energized or would cause significant impacts to repair/replace). Hazardous utilities shall be de-energized whenever possible.

9.8.6 Spotter

A spotter shall be used to monitor for signs of utilities during advancement of intrusive work (for example, sudden change in advancement of auger or split spoon, presence of pea gravel or sand in soils, presence of concrete or other debris in soils, refusal of auger or excavating equipment). If any suspicious conditions are encountered, stop work immediately and contact the PM or RHSM to evaluate the situation. The spotter must have a method to alert an operator to stop the intrusive activity (for example, air horn, hand signals).

9.9 Utilities (Overhead)

9.9.1 Proximity to Power Lines

It must be determined whether equipment operations including, positioning, and traveling will occur in proximity to power lines within 20 feet (6.1 meters) for line voltage up to 350 kV, and within 50 feet (15.2 meters) for line voltage between 350 kV to 1,000 kV. For power lines over 1,000 kV, the distance must be determined by the utility/operator or qualified registered professional engineer in electrical power transmission and distribution.

Operations adjacent to overhead power lines are PROHIBITED unless one of the following conditions is satisfied:

- Power has been shut off, positive means (such as lockout) have been taken to prevent the lines from being energized, lines have been tested to confirm the outage, and the utility company has provided a signed certification of the outage.
- The minimum clearance from energized overhead lines is as shown in the table below, or the equipment will be repositioned and blocked to ensure that no part, including cables, can come within the minimum clearances shown in the table.

Minimum Distances from Powerlines

Powerlines Nominal System Kv	Minimum Required Distance, Feet (Meters)
0-50	10 (3.0)
50-200	15 (4.6)
201-350	20 (6.1)
351-500	25 (7.6)
501-750	35 (10.7)
751-1000	45 (13.7)
Over 1000	Established by utility owner/operator or by a professional engineer in electrical power transmission/distribution

(These distances have been determined to eliminate the potential for arcing based on the line voltage.)

- The power line(s) has been isolated through the use of insulating blankets which have been properly placed by the utility. If insulating blankets are used, the utility will determine the minimum safe operating distance; get this determination in writing with the utility representative's signature.
- All inquiries regarding electric utilities must be made in writing and a written confirmation of the outage/isolation must be received by the PM prior to the start of work.

9.10 Working Around Material Handling Equipment

When CH2M personnel are exposed to material handling equipment, the following safe work practices/hazard controls shall be implemented:

- Never approach operating equipment from the rear. Always make positive contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment; remain outside of the swing and turning radius.
- Maintain distance from pinch points of operating equipment.
- Never turn your back on any operating equipment.
- Never climb onto operating equipment or operate contractor/subcontractor equipment.
- Never ride contractor/subcontractor equipment unless it is designed to accommodate passengers and equipped with firmly attached passenger seat.
- Never work or walk under a suspended load.
- Never use equipment as a personnel lift; do not ride excavator buckets or crane hooks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.
- Wear a high visibility safety vest or high visibility clothing

Physical Hazards and Controls

Physical hazards include exposure to temperature extremes, sun, noise, and radiation. If you encounter a physical hazard that has not been identified in this plan, contact the RHSM so that a revision to this plan can be made.

10.1 Contingency Plan for Severe Weather

10.1.1 Inclement Weather

- Work may proceed in light rain—wear rain gear. However, no roof work can proceed during any storm event.
- Exposure to slips, trips, and falls is increased during rainy conditions.
- Take cover in a sheltered location during adverse weather conditions (high winds, heavy rain).
- Work shall cease and cover shall be taken in the event of lightning or tornado warnings.
- Identify “Take Shelter” areas before starting the project.
- Notify the PM and Client representative after shelter has been sought.

Adverse weather conditions requiring immediate suspension of fieldwork activities are defined as the following:

- Thunder or lightning. Thunderstorm watches or warning, as the situation warrants, will be used as an alert to potential electrical activity. Typically, a 30-minute stand-down occurs to allow the storm cell to pass the area. If lightning or thunder is observed within the stand down period, the 30-minute timeframe is extended until electrical activity ceases.
- Sustained wind gusts of 25 miles per hour (mph) for boating activities.
- Sustained wind speeds of 25 mph or wind gusts of 35 mph for high-profile work where wind chill is not a factor, that is, greater than 60 degrees Fahrenheit (°F).
- Sustained wind speeds of 40 mph or wind gusts of 45 mph for non-high-profile work.
- Moderate rain and/or snow fall of 0.11 to 0.3 inch per hour during hoisting activities. Freezing rain is also cause for suspending hoist use.
- An equivalent wind chill factor of minus 24°F on the wind chill factor chart (see Section 10.4.2) will trigger systematic shut down of all non-emergency work activities.
- A tornado or hurricane warning for the general area or county will suffice in requiring a general work stoppage.
- If you are inadvertently caught outside in a thunder/lightning storm, move away from all metal structures.

10.2 Noise

(Reference CH2M SOP HSE-108, *Hearing Conservation*)

CH2M is required to control employee exposure to occupational noise levels of 85 A-weighted decibels (dBA), A-weighted, and above by implementing a hearing conservation program that meets the requirements of the OSHA Occupational Noise Exposure Standard, 29 CFR 1910.95. A noise assessment may be conducted by the RHSM or designee based on potential to emit noise above 85 dBA and also considering the frequency and duration of the task.

- Areas or equipment emitting noise at or above 90 dBA shall be evaluated to determine feasible engineering controls. When engineering controls are not feasible, administrative controls can be developed and appropriate hearing protection will be provided.
- Areas or equipment emitting noise levels at or above 85 dBA, hearing protection must be worn.

- Employees exposed to 85 dBA or a noise dose of 50 percent must participate in the hearing conservation program including initial and annual (as required) audiograms.
- The RHSM will evaluate appropriate controls measures and work practices for employees who have experienced a standard threshold shift in their hearing.
- Employees who are exposed at or above the action level of 85 dBA are required to complete the online Noise Training Module located on CH2M's Virtual Office.
- Hearing protection will be maintained in a clean and reliable condition, inspected prior to use and after any occurrence to identify any deterioration or damage, and damaged or deteriorated hearing protection repaired or discarded.
- In work areas where actual or potential high noise levels are present at any time, hearing protection must be worn by employees working or walking through the area.
- Areas where tasks requiring hearing protection are taking place may become hearing protection required areas as long as that specific task is taking place.
- High noise areas requiring hearing protection should be posted or employees must be informed of the requirements in an equivalent manner and a copy of the OSHA standard 29 CFR 1910.95 shall be posted in the workplace.

10.3 Ultraviolet Radiation (sun exposure)

Health effects regarding ultraviolet (UV) radiation are confined to the skin and eyes. Overexposure can result in many skin conditions, including erythema (redness or sunburn), photoallergy (skin rash), phototoxicity (extreme sunburn acquired during short exposures to UV radiation while on certain medications), premature skin aging, and numerous types of skin cancer. Implement the following controls to avoid sunburn.

10.3.1 Limit Exposure Time

- Rotate staff so the same personnel are not exposed all of the time.
- Limit exposure time when UV radiation is at peak levels (approximately 2 hours before and after the sun is at its highest point in the sky).
- Avoid exposure to the sun, or take extra precautions when the UV index rating is high.

10.3.2 Provide Shade

- Take lunch and breaks in shaded areas.
- Create shade or shelter through the use of umbrellas, tents, and canopies.
- Fabrics such as canvas, sailcloth, awning material and synthetic shade cloth create good UV radiation protection.
- Check the UV protection of the materials before buying them. Seek protection levels of 95 percent or greater, and check the protection levels for different colors.

10.3.3 Clothing

- Reduce UV radiation damage by wearing proper clothing; for example, long sleeved shirts with collars, and long pants. The fabric should be closely woven and should not let light through.
- Head protection should be worn to protect the face, ears, and neck. Wide-brimmed hats with a neck flap or "Foreign Legion" style caps offer added protection.
- Wear UV-protective sunglasses or safety glasses. These should fit closely to the face. Wrap-around style glasses provide the best protection.

10.3.4 Sunscreen

- Apply sunscreen generously to all exposed skin surfaces at least 20 minutes before exposure, allowing time for it to adhere to the skin.
- Reapply sunscreen at least every 2 hours, and more frequently when sweating or performing activities where sunscreen may be wiped off.
- Choose a sunscreen with a high sun protection factor. Most dermatologists advocate sun protection factor 30 or higher for significant sun exposure.
- Waterproof sunscreens should be selected for use in or near water, and by those who perspire sufficiently to wash off non-waterproof products.
- Check for expiration dates, because most sunscreens are only good for about 3 years. Store in a cool place out of the sun.
- No sunscreen provides 100 percent protection against UV radiation. Other precautions must be taken to avoid overexposure.

10.4 Temperature Extremes

(Reference CH2M SOP HSE-211, *Heat and Cold Stress*)

Each employee is responsible for the following:

- Recognizing the symptoms of heat or cold stress.
- Taking appropriate precautionary measures to minimize their risk of exposure to temperature extremes (see following sections).
- Communicating any concerns regarding heat and cold stress to their supervisor or SC.

10.4.1 Heat

Heat-related illnesses are caused by more than just temperature and humidity factors.

Physical fitness influences a person's ability to perform work under heat loads. At a given level of work, the more fit a person is, the less the physiological strain, the lower the heart rate, the lower the body temperature (indicates less retained body heat—a rise in internal temperature precipitates heat injury), and the more efficient the sweating mechanism.

Acclimatization is a gradual physiological adaptation that improves an individual's ability to tolerate heat stress. Acclimatization requires physical activity under heat-stress conditions similar to those anticipated for the work. With a recent history of heat-stress exposures of at least 2 continuous hours per day for 5 of the last 7 days to 10 of the last 14 days, a worker can be considered acclimatized. Its loss begins when the activity under those heat-stress conditions is discontinued, and a noticeable loss occurs after 4 days and may be completely lost in 3 to 4 weeks. Because acclimatization is to the level of the heat-stress exposure, a person will not be fully acclimatized to a sudden higher level, such as during a heat wave.

Dehydration reduces body water volume. This reduces the body's sweating capacity and directly affects its ability to dissipate excess heat.

The ability of a body to dissipate heat depends on the ratio of its surface area to its mass (surface area/weight).

Heat dissipation is a function of surface area, while heat production depends on body mass. Therefore, overweight individuals (those with a low ratio) are more susceptible to heat-related illnesses because they produce more heat per unit of surface area than if they were thinner. Monitor these persons carefully if heat stress is likely.

When wearing **impermeable clothing**, the weight of an individual is not as important in determining the ability to dissipate excess heat because the primary heat dissipation mechanism, evaporation of sweat, is ineffective.

Symptoms and Treatment Of Heat Stress

	Heat Syncope	Heat Rash	Heat Cramps	Heat Exhaustion	Heat Stroke
Signs and Symptoms	Sluggishness or fainting while standing erect or immobile in heat.	Profuse tiny raised red blister-like vesicles on affected areas, along with prickling sensations during heat exposure.	Painful spasms in muscles used during work (arms, legs, or abdomen); onset during or after work hours.	Fatigue, nausea, headache, giddiness; skin clammy and moist; complexion pale, muddy, or flushed; may faint on standing; rapid thready pulse and low blood pressure; oral temperature normal or low.	Red, hot, dry skin; dizziness; confusion; rapid breathing and pulse; high oral temperature of 104°F or higher.
Treatment	Remove to cooler area. Rest lying down. Increase fluid intake. Recovery usually is prompt and complete.	Use mild drying lotions and powders, and keep skin clean for drying skin and preventing infection.	Remove to cooler area. Rest lying down. Increase fluid intake.	Remove to cooler area. Rest lying down, with head in low position. Administer fluids by mouth. Seek medical attention.	Cool rapidly by soaking in cool—but not cold—water. Call ambulance, and get medical attention immediately!

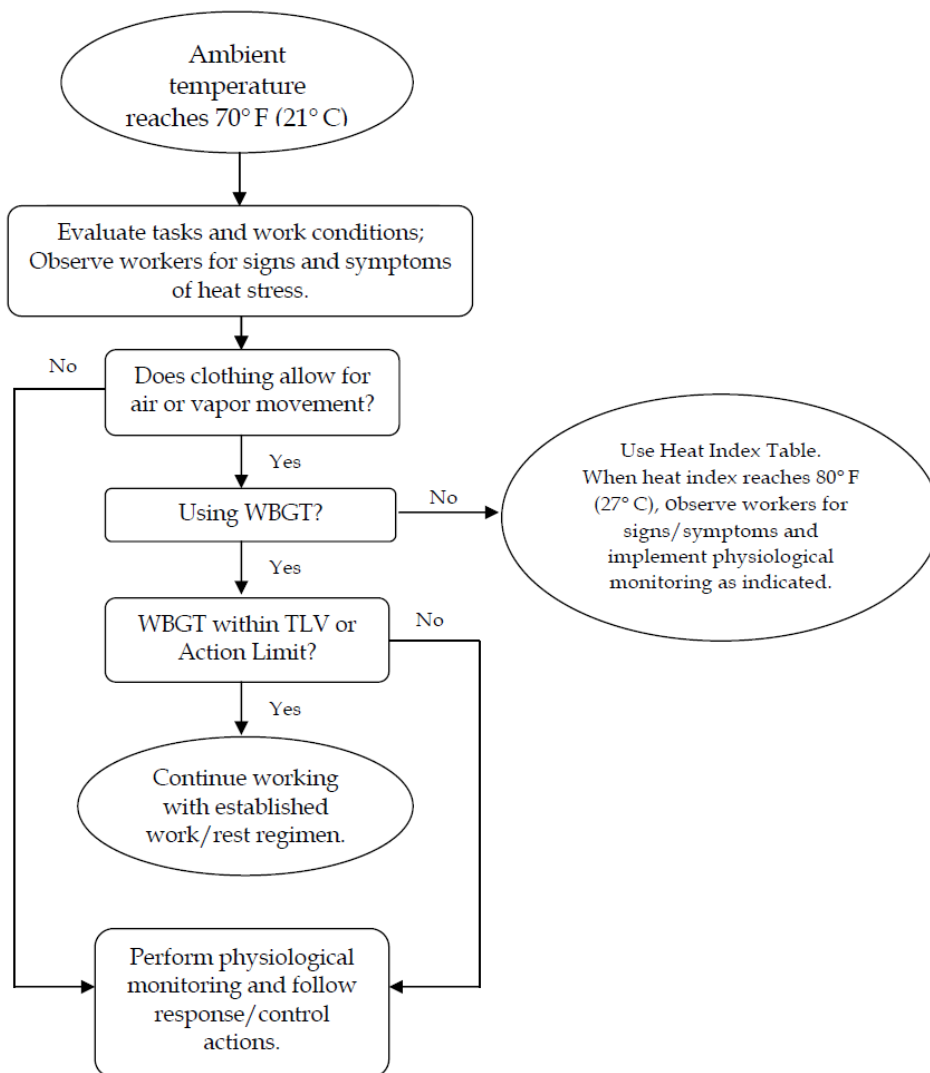
10.4.2 Precautions

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F (10 degrees Celsius [°C]) to 60°F (15.6°C) should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons (7.5 liters) per day. Remind employees to drink water throughout their work shift.
- Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate to site work conditions by slowly increasing workloads; for example, do not begin site work with extremely demanding activities. Closely monitor employees during their first 14 days of work in the field.
- Supervisors and SCs must continually observe employees throughout the work shift for signs and symptoms of heat stress or illness. Employees must monitor themselves for heat stress as well as observe their coworkers.
- Effective communication must be maintained with employees throughout the work shift either by voice, observation, or electronic device.
- Use cooling devices, such as cooling vests, to aid natural body ventilation. These devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Avoid direct sun whenever possible, which can decrease physical efficiency and increase the probability of heat stress. Take regular breaks in a cool, shaded area. Use a wide-brim hat or an umbrella when working under direct sun for extended periods.
- Provide adequate shade to protect personnel against radiant heat (sun, flames, hot metal).
- Use portable fans for convection cooling or in extreme heat conditions, an air-conditioned rest area when needed.
- In hot weather, rotate shifts of workers.
- Maintain good hygiene standards by frequent changes of clothing and showering. Clothing should be permitted to dry during rest periods. Persons who notice skin problems should consult medical personnel.

- Brief employees initially before the project work begins and routinely as part of the daily safety briefing, on the signs and symptoms, of heat-relatedness illnesses, precautions to measures and emergency procedures to follow as described in this plan.
- Observe one another for signs of heat stress. PREVENTION and communication are key.

10.4.3 Thermal Stress Monitoring

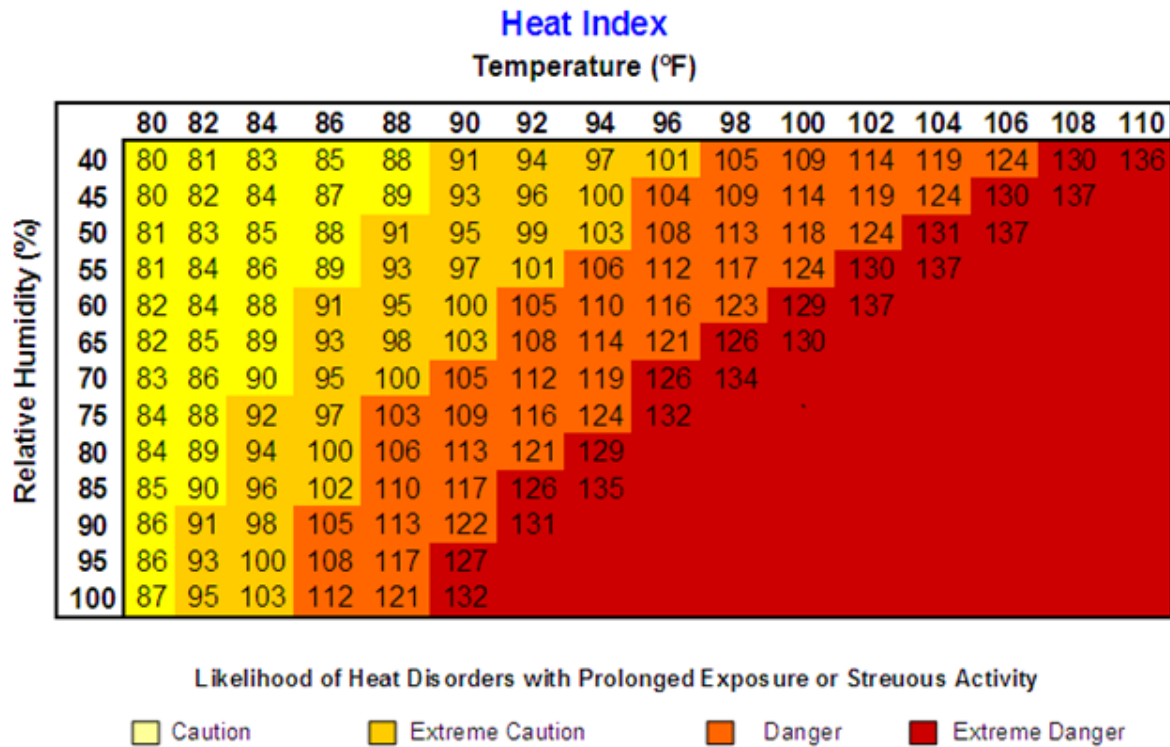
Thermal Stress Monitoring Flow Chart



10.4.4 Thermal Stress Monitoring—Permeable or Impermeable Clothing

When **permeable work clothes** are worn (street clothes or clothing ensembles over street clothes), regularly observe workers for signs and symptoms of heat stress and implement physiological monitoring as indicated below. This should start when the heat index reaches 80°F (27°C) [see Heat Index Table below], or sooner if workers exhibit symptoms of heat stress indicated in the table above. The heat index values were devised for shady, light wind conditions; exposure to full sunshine can increase the values by up to 15°F (8°C). Also, strong winds, particularly with very hot, dry air, can be extremely hazardous.

When wearing **impermeable clothing** (for example, clothing doesn't allow for air or water vapor movement such as Tyvek), physiological monitoring as described below shall be conducted when the ambient temperature reaches 70°F (21°C) or sooner when climatic conditions may present greater risk of heat stress combined with wearing unique variations of impermeable clothing, or workers exhibit symptoms of heat stress.



Heat Index	Possible Heat Disorders	Minimum Frequency of Physiological Monitoring
80°F - 90°F (27°C - 32°C)	Fatigue possible with prolonged exposure and/or physical activity	Conduct initial monitoring as baseline and observe workers for signs of heat stress and implement physiological monitoring if warranted.
90°F - 105°F (32°C - 41°C)	Sunstroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity	Conduct initial monitoring as baseline, then at least every hour, or sooner, if signs of heat stress are observed.
105°F - 130°F (41°C - 54°C)	Sunstroke, heat cramps, or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity.	Conduct initial monitoring as baseline, then every 30 minutes or sooner if signs of heat stress are observed.
130°F or Higher (54°C or Higher)	Heat/Sunstroke highly likely with continued exposure.	Conduct initial monitoring as baseline, then every 15 minutes or sooner if signs of heat stress are observed.
Source: National Weather Service		

10.4.4.1 Physiological Monitoring and Associated Actions

For employees wearing permeable clothing, follow the minimum frequency of physiological monitoring listed in the Heat Index Table.

For employees wearing impermeable clothing, physiological monitoring should begin initially at a 15-minute interval, then if the employee's heart rate or body temperature is within acceptable limits, conduct the subsequent physiological monitoring at 30 minutes, and follow the established regimen protocol below.

When physiological monitoring is required, use either radial pulse or aural temperature and follow actions below:

- The sustained heart rate during the work cycle should remain below 180 beats per minute (bpm) minus the individual's age (for example 180 – 35 year old person = 145 bpm). The sustained heart rate can be estimated by measuring the heart rate at the radial pulse for 30 seconds as quickly as possible prior to starting the rest period.
- The heart rate after one minute rest period should not exceed 120 bpm.
- If the heart rate is higher than 120 bpm after the FIRST minute into the rest period, the next work period should be shortened by 33 percent, while the length of the rest period stays the same.
- If the pulse rate still exceeds 120 bpm at the beginning of the next rest period, the following work cycle should be further shortened by 33 percent.
- Continue this procedure until the rate is maintained below 120 bpm after the FIRST minute into the rest period.

Alternately, the body temperature can be measured, either oral or aural (ear), before the workers have something to drink.

- If the oral or aural temperature exceeds 99.6°F (37.6°C) at the beginning of the rest period, the following work cycle should be shortened by 33 percent.
- Continue this procedure until the oral or aural (ear) temperature is maintained below 99.6°F (37.6°C). While an accurate indication of heat stress, oral temperature is difficult to measure in the field; however, a digital aural (aural) thermometer is easy to obtain and inexpensive to purchase.
- Use the form attached to this SSHP to track workers' measurements and actions taken.

10.4.4.2 Procedures for when Heat Illness Symptoms are Experienced

- **Always** contact the RHSM when any heat illness related symptom is experienced so that controls can be evaluated and modified, if needed.
- In the case of cramps, reduce activity, increase fluid intake, move to shade until recovered.
- In the case of all other heat-related symptoms (fainting, heat rash, heat exhaustion), and if the worker is a CH2M worker, contact the occupational physician at 1-866-893-2514 and immediate supervisor.
- In the case of heat stroke symptoms, call 911, have a designee give location and directions to ambulance service if needed, follow precautions under the emergency medical treatment of this SSHP.
- Follow the Incident Notification, Reporting, and Investigation section of this SSHP.

10.4.5 Cold

10.4.5.1 General

Low ambient temperatures increase the heat lost from the body to the environment by radiation and convection. In cases where the worker is standing on frozen ground, the heat loss is also due to conduction.

Wet skin and clothing, whether because of water or perspiration, may conduct heat away from the body through evaporative heat loss and conduction. Thus, the body cools suddenly when chemical protective clothing is removed if the clothing underneath is perspiration-soaked.

Movement of air across the skin reduces the insulating layer of still air just at the skin's surface. Reducing the insulating layer of air increases heat loss by convection.

Non-insulating materials in contact or near-contact with the skin, such as boots constructed with a metal toe or shank, conduct heat rapidly away from the body.

Certain common drugs, such as alcohol, caffeine, or nicotine, may exacerbate the effects of cold, especially on the extremities. The chemicals reduce the blood flow to peripheral parts of the body, which are already high-risk

areas because of their large surface area to volume ratios. These substances may also aggravate an already hypothermic condition.

10.4.5.2 Precautions

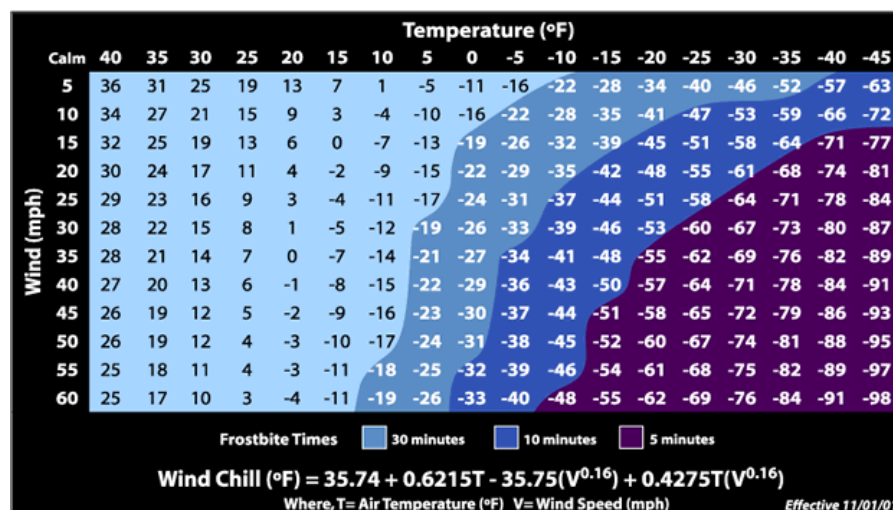
- Be aware of the symptoms of cold-related disorders, and wear proper, layered clothing for the anticipated fieldwork. Appropriate rain gear is a must in wet weather.
- Consider monitoring the work conditions and adjusting the work schedule using guidelines developed by the U.S. Army (wind-chill index) and the National Safety Council.
- Wind-Chill Index (below) is used to estimate the combined effect of wind and low air temperatures on exposed skin. The wind-chill index does not take into account the body part that is exposed, the level of activity, or the amount or type of clothing worn. For those reasons, it should only be used as a guideline to warn workers when they are in a situation that can cause cold-related illnesses.
- Persons who experience initial signs of immersion foot, frostbite, and/or hypothermia should report it immediately to their supervisor/PM to avoid progression of cold-related illness.
- Observe one another for initial signs of cold-related disorders.
- Obtain and review weather forecast – be aware of predicted weather systems along with sudden drops in temperature, increase in winds, and precipitation.

Symptoms and Treatment Of Cold Stress

	Immersion (Trench) Foot	Frostbite	Hypothermia
Signs and Symptoms	Feet discolored and painful; infection and swelling present.	Blanched, white, waxy skin, but tissue resilient; tissue cold and pale.	Shivering, apathy, sleepiness; rapid drop in body temperature; glassy stare; slow pulse; slow respiration.
Treatment	Seek medical treatment immediately.	Remove victim to a warm place. Re-warm area quickly in warm—but not hot—water. Have victim drink warm fluids, but not coffee or alcohol. Do not break blisters. Elevate the injured area, and get medical attention.	Remove victim to a warm place. Have victim drink warm fluids, but not coffee or alcohol. Get medical attention.



Wind Chill Chart



10.5 Radiological Hazards

Refer to CH2M's Core Standard, Radiological Control and Radiological Controls Manual for additional requirements.

Hazards	Controls
None Known	None Required

SECTION 11

Biological Hazards and Controls

Biological hazards are everywhere and change with the region and season. During project planning stages, ask the site Point of Contact if there are insect or other biological hazards that have been noted at any of the work sites.

If you encounter a biological hazard that has not been identified in this plan, contact the RHSM so that a revision to this plan can be made. Whether it is contact with a poisonous plant, a poisonous snake, or a bug bite, do not take bites or stings lightly. If there is a chance of an allergic reaction or infection, or to seek medical advice on how to properly care for the injury, contact the occupational nurse at 1-866-893-2514.

11.1 Bees and Other Stinging Insects

Bees and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic.

Precautions include the following:

- Watch for and avoid nests.
- Keep exposed skin to a minimum.
- Carry a kit if you have had allergic reactions in the past, and inform your supervisor and/or a buddy. When working at a remote location, ensure that first-aid kits contain over-the-counter allergy and itch medication (for example, Benadryl, Claritin, etc.) as well as other over-the-counter medications that may not be available to aid in symptom treatment.
- If bees or other stinging insects are known to be present, determine whether additional protective clothing should be donned before entering/working in brushy areas.
- Before entering a heavily vegetated or brushy area, observe the area for several minutes to see if bees or other stinging insects may be present. If nests or individual insects are observed, retreat and inquire whether a specialist or a client service can be contacted to clear the area before work proceeds.
- Consider if heavy-weight clothing or Tyvek, or head netting would provide additional protection in areas where wasps/bees are known or suspected. Be aware of heat stress conditions that additional clothing may cause.
- Use insect repellent on clothing. Wear light-colored clothing and remove bright reflective safety-colored clothing if not working near a roadway as these may attract the wasps.
- Wear fragrance-free or lightly-scented sunscreen, and body lotions. Bees are attracted to sweet scents. Avoid using floral scented soaps, shampoos, or conditioners.
- Move slowly and calmly through vegetated areas and try to avoid major disturbance of vegetation as wasps/bees often react to aggressive movement.
- If you encounter a wasp, back away slowly and calmly, do not run or swat at the insect. Wait for it to leave, or gently move or brush it off gently with a piece of paper or other light object. Do not use your hand.

If you are stung, contact the occupational nurse at 1-866-893-2514, no matter how minor it may seem. If a stinger is present, remove it as soon as possible using something with a thin, hard edge (for example, credit card) to scrape the stinger out. Be sure to sanitize the object first with hand sanitizer, alcohol, or soap and water. Wash and disinfect the wound, cover it, and apply ice. Watch for an allergic reaction if you have never been stung before. Call 911 if the reaction is severe.

11.2 Feral Dogs

Avoid all dogs, both leashed and stray. Do not disturb a dog while it is sleeping, eating, or caring for puppies. If a dog approaches to sniff you, stay still. An aggressive dog has a tight mouth, flattened ears, and a direct stare. If you are threatened by a dog, remain calm, do not scream, and avoid eye contact. If you say anything, speak calmly and firmly. Do not turn and run, try to stay still until the dog leaves, or back away slowly until the dog is out of sight or you have reached safety (for example vehicle). If attacked, retreat to vehicle or attempt to place something between you and the dog. If you fall or are knocked to the ground, curl into a ball with your hands over your head and neck and protect your face. If bitten, contact the occupational nurse at 1-866-893-2514. Report the incident to the local authorities.

11.3 Fire Ants

There are several types of fire ants in the United States that can cause painful bites and allergic reactions. Fire ants aggressively defend their nests by stinging several times after climbing on their victims. Large ant mounds are easily visible, but there can be smaller mounds or nests with little “worked” soil that can be stepped on inadvertently. They can also be under rocks, wood, or other debris. Implement the following when fire ants are observed:

- Be aware of fire ants and take care not to stand on ant nests.
- Use insect repellents on clothing and footwear to temporarily discourage ants from climbing.
- Tuck pants into socks.

If stung, get away from the area on which you are standing, briskly brush off ants, and wash the affected area with soap. Call the occupational nurse.

11.4 Giant Hogweed

Giant hogweed is a noxious weed that has become established in New York, Pennsylvania, Ohio, Maryland, Oregon, Washington, Michigan, Virginia, Vermont, New Hampshire, Maine, and adjacent areas of Canada, but can be spread to surrounding areas.

Its sap, in combination with moisture and sunlight, can cause phytophotodermatitis—a serious skin inflammation and severe eye irritation leading to blindness. Contact between the skin and the sap of this plant occurs either through brushing against the bristles on the stem or breaking the stem or leaves. Eye exposure to the sap can occur during the breaking of the stems (during clearing/grubbing). Heat, sunlight, and moisture worsen the skin reaction.

Giant hogweed is a biennial or perennial that can grow up to 12 feet (approximately 3.5 meters) or more. Its hollow, ridged stems grow 2 to 4 inches (5 to 10 centimeters) in diameter and have dark reddish-purple blotches. Its large compound leaves can grow up to 5 feet (1.5 meters) wide. Its white flower heads can grow up to 2.5 feet (approximately 1 meter) in diameter.

Symptoms of exposure include initial itching and redness, then painful blisters form within 48 hours with the area becoming dark and pigmented. Long-term effects include scarring, sensitivity of the affected area to sunlight, and temporary or permanent blindness if it gets into the eyes.

As with all hazardous plants, recognition and avoidance is key. Do not touch any portion of the plant. Become familiar with the identity of the plants (see below). Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and cold water immediately. Keep exposed area away from sunlight for 48 hours. Contact the occupational nurse immediately.



11.5 Mosquito Bites

Because of the recent detection of the West Nile Virus in the southwestern United States, it is recommended that preventative measures be taken to reduce the probability of being bitten by mosquitoes whenever possible. Mosquitoes are believed to be the primary source for exposure to the West Nile Virus as well as several other types of encephalitis. The following guidelines should be followed to reduce the risk of these concerns for working in areas where mosquitoes are prevalent:

- Stay indoors at dawn, dusk, and in the early evening.
- Wear long-sleeved shirts and long pants whenever you are outdoors
- Spray clothing with repellents containing permethrin or N,N-diethyl-meta-toluamide (DEET) since mosquitoes may bite through thin clothing.
- Apply insect repellent sparingly to exposed skin. An effective repellent will contain 35 percent DEET. Repellents may irritate the eyes and mouth, so avoid applying repellent to the hands.
- Whenever you use an insecticide or insect repellent, be sure to read and follow the manufacturer's DIRECTIONS FOR USE, as printed on the product.

Vitamin B and "ultrasonic" devices are NOT effective in preventing mosquito bites.

11.5.1 Symptoms of Exposure to the West Nile Virus

Most infections are mild, and symptoms include fever, headache, and body aches, occasionally with skin rash and swollen lymph glands. More severe infection may be marked by headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, and, rarely, death.

The West Nile Virus incubation period is from 3 to 15 days.

Contact the project RHSM with questions, and immediately report any suspicious symptoms to your supervisor and PM, and contact the occupational nurse at 1-866-893-2514.

11.6 Poison Ivy, Poison Oak, and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Shrubs are usually 12 to 30 inches high, or can also be a tree-climbing vine, with triple leaflets and short, smooth hair underneath. Plants are red and dark green in spring

and summer, with yellowing leaves anytime especially in dry areas. Leaves may achieve bright reds in fall, but plants lose its (yellowed, then brown) leaves in winter, leaving toxic stems. All parts of the plant remain toxic throughout the seasons. These plants contain urushiol a colorless or pale yellow oil that oozes from any cut or crushed part of the plant, including the roots, stems and leaves and causes allergic skin reactions when contacted. The oil is active year round.

Become familiar with the identity of the plants (see images below). Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

Poison Ivy



Poison Sumac



Poison Oak



Contamination with poison ivy, sumac, or oak can happen through several pathways, including the following:

- Direct skin contact with any part of the plant (even roots once aboveground foliage has been removed).
- Contact with clothing that has been contaminated with the oil.
- Contact from removing shoes that have been contaminated (shoes are coated with urushiol oil).
- Sitting in a vehicle that has become contaminated.
- Contact with any objects or tools that have become contaminated.
- Inhalation of particles generated by weed-whacking, chipping, and vegetation clearing.

If you must work on a site with poison ivy, sumac, or oak, the following precautions are necessary:

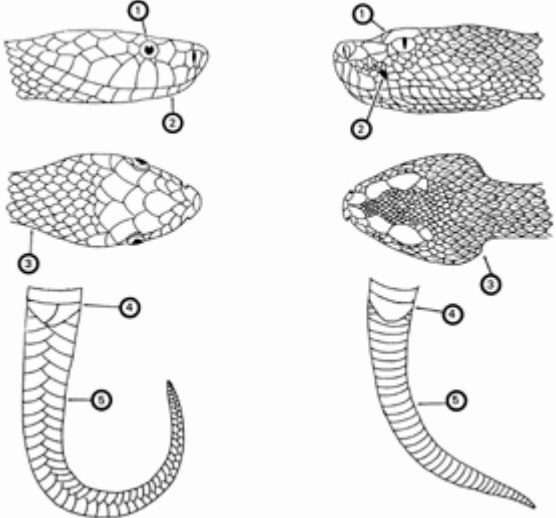
- Do not drive vehicles onto the site where it will come into contact with poison ivy, sumac, or oak. Vehicles that need to work in the area, such as drill rigs or heavy equipment must be washed as soon as possible after leaving the site.
- All tools used in the poison ivy, sumac, or oak area, including those used to cut back poison oak, surveying instruments used in the area, air monitoring equipment, or other test apparatus must be decontaminated before they are placed back into the site vehicle. If onsite decontamination is not possible, use plastic to wrap any tools or equipment until they can be decontaminated.
- PPE, including Tyvek coveralls, gloves, and boot covers must be worn. PPE must be placed into plastic bags and sealed if they are not disposed of immediately into a trash receptacle.
- As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with Zanfel, Tecnu, or other product designed for removing urushiol. If you do not have Zanfel or Tecnu, wash with cold water. Do not take a bath because the oils can form an invisible film on top of the water and contaminate your entire body upon exiting the bath.
- Tecnu may also be used to decontaminate equipment.
- Use IvyBlock or similar products to prevent poison oak, ivy, and sumac contamination. Check with the closest CH2M warehouse to see if these products are available. Follow all directions for application.

If you do come into contact with one of these poisonous plants and a reaction develops, contact your supervisor and the occupational nurse 1-866-893-2514.

11.7 Snakes

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Call the occupational nurse at 1-866-893-2514 immediately. Do not apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings. The following is a guide to identifying poisonous snakes from non-poisonous snakes.

Identification of Poisonous Snakes

Major Identification Features Non-venomous Snake	Major Identification Features Venomous Snake
<ol style="list-style-type: none"> 1. Round pupils 2. No sensing pit 3. Head slightly wider than neck 4. Divided anal plate 5. Double row of scales on the underside of the tail 	<ol style="list-style-type: none"> 1. Elliptical pupils 2. Sensing pit between eye and nostril 3. Head much wider than neck 4. Single anal plate 5. Single scales on the underside of the tail
	

11.8 Spiders—Brown Recluse and Widow

The Brown Recluse spider can be found most anywhere in the United States. It varies in size in shape, but the distinguishing mark is the violin shape on its body. They are typically non-aggressive. Keep an eye out for irregular, pattern-less webs that sometimes appear almost tubular built in a protected area such as in a crevice or between two rocks. The spider will retreat to this area of the web when threatened.

The Black Widow, Red Widow, and the Brown Widow are all poisonous. Most have globose, shiny abdomens that are predominantly black with red markings (although some may be pale or have lateral stripes), with moderately long, slender legs. The spiders are nocturnal and build a three-dimensional tangled web, often with a conical tent of dense silk in a corner where the spider hides during the day.

11.8.1 Hazard Controls

- Inspect or shake out any clothing, shoes, towels, or equipment before use.

- Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials.
- Minimize the empty spaces between stacked materials.
- Remove and reduce debris and rubble from around the outdoor work areas.
- Trim or eliminate tall grasses from around outdoor work areas.
- Store apparel and outdoor equipment in tightly closed plastic bags.
- Keep your tetanus boosters up-to-date (every 10 years). Spider bites can become infected with tetanus spores.

If you think you have been bit by a poisonous spider, immediately call the occupational nurse at 1-866-893-2514 and follow the guidance below:

- Remain calm. Too much excitement or movement will increase the flow of venom into the blood.
- Apply a cool, wet cloth to the bite or cover the bite with a cloth and apply an ice bag to the bite.
- Elevate the bitten area, if possible.
- Do not apply a tourniquet, and do not try to remove venom.
- Try to positively identify the spider to confirm its type. If the spider has been killed, collect it in a plastic bag or jar for identification purposes. Do not try to capture a live spider—especially if you think it is a poisonous spider.

Black Widow



Red Widow



Brown Widow



Brown Recluse



11.9 Ticks

Every year employees are exposed to tick bites at work and at home putting them at risk of illness. Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown and can be up to 0.25 inch (6.4 millimeters) in size.

In some geographic areas, exposure is not easily avoided. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray only outside of clothing with permethrin or permethrin and spray skin with DEET only. Check yourself frequently for ticks.

Where site conditions (vegetation above knee height, tick-endemic area) or when tasks (having to sit or kneel in vegetation) diminish the effectiveness of the controls mentioned above, bug-out suits (check with your local or regional warehouse) or Tyvek shall be used. Bug-out suits are more breathable than Tyvek.

Take precautions to avoid exposure by including pre-planning measures for biological hazards prior to starting fieldwork. Avoid habitats where possible and reduce the abundance through habitat disruption or application of acaricide. If the controls aren't feasible, contact your local or regional warehouse for preventative equipment such as repellants, protective clothing, and tick-removal kits. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue fieldwork until the controls can be implemented.

See tick fact sheet attached to this SSHP for further precautions and controls to implement when ticks are present. If bitten by a tick, follow the removal procedures found in the tick fact sheet, and call the occupational nurse at 1-866-893-2514.

Be aware of the symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Lyme disease is a rash that might appear. The rash looks like a bull's eye with a small welt in the center. RMSF is a rash of red spots under the skin 3 to 10 days after the tick bite. In both RMSF and Lyme disease, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, again contact the occupational nurse at 1-866-893-2514.

Be sure to complete an Incident Report (either use the Hours and Incident Tracking System [HITS] system on the Virtual Office) if you do come in contact with a tick.

SECTION 12

Contaminants of Concern

Table 12-1 summarizes the potential COCs and their occupational exposure limit and signs and symptoms of exposure. The table also includes the maximum concentration of each COC and the associated location and media that was sampled (groundwater, soil boring, surface soil). The concentrations were used to determine engineering and administrative controls described in the "Project-Specific Hazard Controls" section of this SSHP, as well as PPE and site monitoring requirements.

The data inserted in the table was gathered from the UXO 20 update presentation, April 2015. UXO 20 is a site because of MEC, not because of chemical contamination. Sampling shows the following surface soil: few semivolatile organic compounds (SVOCs) exceeding regional screening levels (RSLs), primarily benzo (a) pyrene, hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) at 72 milligrams per kilogram (mg/kg), and metals exceedances. Subsurface soil SVOCs, metals. Groundwater SVOCs, perchlorate, metals.

TABLE 12-1
Contaminants of Concern

Contaminant	Location and Maximum ^a Concentration (ppm)	Exposure Limit ^b	IDLH ^c	Symptoms and Effects of Exposure	PIP ^d (eV)
Arsenic	GW: 20.2 ug/L SB: 17.2 mg/kg SS: 10.4mg/kg	0.01 mg/m ³	5 mg/m ³ as As Ca	Ulceration of nasal septum, respiratory irritation, dermatitis, gastrointestinal disturbances, peripheral neuropathy, hyperpigmentation	NA
Cadmium	SB: 6.75 mg/kg SS: 55.3 mg/kg	0.005 mg/m ³	9 mg/m ³ as Cd Ca	Pulmonary edema, coughing, chest tightness/pain, headache, chills, muscle aches, nausea, vomiting, diarrhea, difficulty breathing, loss of sense of smell, emphysema, mild anemia	NA
Chromium (as Cr(II) & Cr(III))	GW: 10.8 ug/L SB: 55.3 mg/kg SS: 238 mg/kg	0.5 mg/m ³	25 mg/m ³	Irritated eyes, sensitization dermatitis, histologic fibrosis of lungs	NA
Cobalt (Metal, Dusts, and Fumes)	GW: 2.4 ug/L SB: 13 mg/kg SS: 17.1 mg/kg	0.05 mg/m ³	20 mg/m ³	Coughing, difficulty breathing, wheezing, decreased pulmonary function, diffuse nodule fibrosous, dermatitis, respiratory hypersensitivity, asthma	NA
Lead	GW: 1,230 ug/L SB: 2,260 mg/kg SS: 5,130 mg/kg	0.05 mg/m ³	100 mg/m ³ as Pb	Weakness lassitude, facial pallor, pal eye, weight loss, malnutrition, abdominal pain, constipation, anemia, gingival lead line, tremors, paralysis of wrist and ankles, encephalopathy, kidney disease, irritated eyes, hypertension	NA
Mercury	GW: 1.61 ug/L SB: 3.78 mg/kg SS: 26 mg/kg	0.025 mg/m ³	10 mg/m ³	Skin and eye irritation, cough, chest pain, difficult breathing, bronchitis, pneumontitis, tremors, insomnia, irritability, indecision, headache, fatigue, weakness, GI disturbance	NA
RDX (cyclonite)	SS: 72.6 mg/kg	1.5 mg/m ³	NL	irritation eyes, skin; headache, irritability, lassitude (weakness, exhaustion), tremor, nausea, dizziness, vomiting, insomnia, convulsions	None

TABLE 12-1
Contaminants of Concern

Contaminant	Location and Maximum ^a Concentration (ppm)	Exposure Limit ^b	IDLH ^c	Symptoms and Effects of Exposure	PIP ^d (eV)
PNAs (Limits as Coal Tar Pitch)	GW: 0.12 ug/L SB: 0.86 mg/kg SS: 0.89 mg/kg	0.2 mg/m ³	80 Ca	Dermatitis and bronchitis	UK

Footnotes:

^a Specify sample-designation and media: SB (Soil Boring), A (Air), D (Drums), GW (Groundwater), L (Lagoon), TK (Tank), SS (Surface Soil), SL (Sludge), SW (Surface Water).

^b Appropriate value of permissible exposure limit (PEL), recommended exposure limit (REL), or threshold limit value (TLV) listed.

^c IDLH = immediately dangerous to life and health (units are the same as specified "Exposure Limit" units for that contaminant); NL = No limit found in reference materials; CA = Potential occupational carcinogen.

^d PIP = photoionization potential; NA = Not applicable; UK = Unknown.

eV = electron volt

mg/m³ = milligrams per cubic meter

µg/m³ = micrograms per cubic meter

SB = soil boring

Potential Routes of Exposure

Dermal: Contact with contaminated media. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of PPE.

Inhalation: Vapors and contaminated particulates. This route of exposure is minimized through use of engineering controls, administrative controls and proper use of respiratory protection when other forms of control do not reduce the potential for exposure.

Other: Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (for example, wash hands and face before drinking or smoking).

SECTION 13

Site Monitoring

(Reference CH2M SOP HSE-207, Exposure Monitoring for Airborne Chemical Hazards)

When performing site monitoring, record all the information (for example, in a field logbook). Note date and time, describe monitoring location (for example, in breathing zone, at source), site location, and what the reading is. If any action levels are reached, note it in the field logbook, and note the action taken.

Exposure records (air sampling) must be preserved for the duration of employment, plus 30 years. Ensure that copies of the field logbook are maintained in the project file.

Copies of all project exposure records (for example, copies of field logbook pages where air monitoring readings are recorded and associated calibration) shall be sent to the regional safety program assistant for retention and maintained in the project files.

13.1 Direct Reading Monitoring Specifications

Instrument	Tasks	Action Levels ^a	Action to be Taken when Action Level reached	Frequency ^b	Calibration
Toxic Gas Monitor: MultiRAE Plus with 10.6 eV lamp (VOCs, O ₂ , LEL, CO, H ₂ S)	Intrusive tasks	< 1 ppm 1 to 10 ppm > 10 ppm	Level D Level C Level B	Initially, and periodically during task	Daily
LEL (MultiRAE)	In excavations	0-10% : 10-25% LEL: >25% LEL:	No explosion hazard Potential explosion hazard Explosion hazard; evacuate or vent	Initially, and periodically during task	Daily
O₂ Meter (MultiRAE)	In excavations	>25% ^c O ₂ : 20.9% ^c O ₂ : <19.5% ^c O ₂ :	Explosion hazard; evacuate or vent Normal O ₂ O ₂ deficient; vent or use SCBA	Initially, and periodically during task	Daily
Hydrogen Sulfide	In excavations	<1 ppm >1 ppm	Level D Stop work, implement engineering controls, if concentrations >1ppm persist, contact HSM to determine appropriate path forward, including an upgrade in respiratory protection.	Initially and periodically during tasks	Zero Daily

NOTE: The GEM 2000 (or equivalent) may be used for H₂S, methane LEL, and O₂ using the action levels listed above.

Dust Monitor: Visual dust	Dust producing tasks	No visual dust Visual dust	Level D implement dust suppression	During excavation	Not applicable
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^a Action levels apply to sustained breathing-zone measurements above background.

^b The exact frequency of monitoring depends on field conditions and is to be determined by the SC; generally, every 5 to 15 minutes if acceptable; more frequently may be appropriate.

^c If the measured percent of O₂ is less than 10, an accurate LEL reading will not be obtained. Percent LEL and percent O₂ action levels apply only to ambient working atmospheres, and not to confined-space entry. More-stringent percent LEL and O₂ action levels are required for confined-space entry.

^d Noise monitoring and audiometric testing also required.

VOC = volatile organic compound

LEL = lower explosive limit

13.2 Calibration Specifications

(Refer to the respective manufacturer's instructions for proper instrument-maintenance procedures)

Instrument	Gas	Span	Reading	Method
PID: MultiRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	0.5 lpm reg T-tubing
MultiRae	H ₂ S	CF = 25	25 ppm	0.5 lpm reg
	CO	CF = 50	50 ppm	T-tubing
	LEL	CF = 50	50 %	
	O ₂	CF = 20.9	20.9 %	

Calibrate air monitoring equipment daily (or prior to use) in accordance with the instrument's instructions. Document the calibration in the field logbook (or equivalent) and include the following information:

- Instrument name
- Serial Number
- Owner of instrument (for example, CH2M, HAZCO)
- Calibration gas (including type and lot number)
- Type of regulator (for example, 1.5 lpm)
- Type of tubing (for example, direct or T-tubing)
- Ambient weather condition (for example, temperature and wind direction)
- Calibration/instrument readings
- Operator's name and signature
- Date and time

Personal Protective Equipment

(Reference EM 385-1-1 Section 5, Personal Protective and Safety Equipment; CH2M- SOP HSE-117, Personal Protective Equipment)

14.1 Required Personal Protective Equipment

PPE must be worn by employees when actual or potential hazards exist and engineering controls or administrative practices cannot adequately control the hazards.

A PPE assessment has been conducted by the RHSM based on project tasks (see PPE specifications below). Verification and certification of assigned PPE by task is completed by the RHSM that approved this plan. Below are items that need to be followed when using any form of PPE:

- Employees must be trained to properly wear and maintain the PPE.
- Employees must be trained in the limitations of the PPE.
- In work areas where actual or potential hazards are present at any time, PPE must be worn by employees working or walking through the area.
- Areas requiring PPE should be posted or employees must be informed of the requirements in an equivalent manner.
- PPE must be inspected prior to use and after any occurrence to identify any deterioration or damage.
- PPE must be maintained in a clean and reliable condition.
- Damaged PPE shall not be used and must either be repaired or discarded.
- PPE shall not be modified, tampered with, or repaired beyond routine maintenance.

The employer shall identify actual or potential hazards and the need for PPE. The following two conditions typically dictate the necessity for PPE: general hazards present in the work area, and hazards created by the tasks being performed. Some work areas have actual or potential hazards that can be present at any time, thereby potentially exposing any personnel working or walking through the area. Such areas should be posted as PPE-required areas, or personnel should be informed of the requirements in an equivalent manner. In addition, the actual task being performed may create a hazard and require personnel who perform this task to wear appropriate PPE. The areas where the tasks are taking place may become PPE-required areas as long as that specific task is taking place. Specific hazardous assessments are conducted through the AHA process, and thus AHAs become the daily tool for proper hazard assessment and mitigation. The following table should be used as a general minimum guideline, with the specific task AHA having the final required protocol for PPE. AHAs are a living document, and should reflect changing site conditions.

Table 14-1 outlines PPE to be used according to task, based on project-specific hazard assessment. If a task other than the tasks described in this table needs to be performed, contact the RHSM so this table can be updated.

TABLE 14-1
Project-specific Personal Protective Equipment Requirements^a

Task	Level	Body	Head	Respirator ^b
DGM	D	Work clothes; safety toed leather work boots and boot covers or safety toed rubber boots and boot wash, and gloves	Hardhat ^c Safety glasses with side shields Ear protection ^d	None required
Intrusive investigation	Modified D	Work clothes or cotton coveralls Boots: Safety-toe, chemical-resistant boots OR Safety -toe, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves. OR Work Clothes or Coveralls. SC to determine body protection based on potential contact with site contaminants. If outer layer of personal clothing cannot be kept clean, then outer cotton coveralls or uncoated Tyvek coveralls shall be worn. (Polycoated Tyvek when there is potential to contact contaminated groundwater or free liquids from drums.)	Hardhat ^c Safety glasses with side shields Ear protection ^d	None required
Work near vehicular traffic ways or earth moving equipment.	All	Appropriate level of ANSI/ISEA 107-2010 high-visibility safety vests.	Work near vehicular traffic ways or earth moving equipment.	
Equipment decontamination if using pressure washer	Modified D with splash protection	Coveralls: Polycoated Tyvek® Boots: 16-inch-high steel-toed rubber boots Gloves: Inner surgical-style nitrile & outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c over safety glasses with side shields or splash goggles Ear protection ^d	None required.

Reasons for Upgrading or Downgrading Level of Protection (with approval of the RHSM)

Upgrade ^f	Downgrade
<ul style="list-style-type: none"> Request from individual performing tasks. Change in work tasks that will increase contact or potential contact with hazardous materials. Occurrence or likely occurrence of gas or vapor emission. Known or suspected presence of dermal hazards. Instrument action levels in the "Site Monitoring" section exceeded. 	<ul style="list-style-type: none"> New information indicating that situation is less hazardous than originally thought. Change in site conditions that decrease the hazard. Change in work task that will reduce contact with hazardous materials.

^a Modifications are as indicated. CH2M will provide PPE only to CH2M employees.

^b No facial hair that would interfere with respirator fit is permitted.

^c Hardhat and splash-shield areas are to be determined by the SC.

^d Ear protection should be worn when conversations cannot be held at distances of 3 feet (1 meter) or less without shouting.

^e See cartridge change-out schedule.

^f Performing a task that requires an upgrade to a higher level of protection (for example, Level D to Level C) is permitted only when the PPE requirements have been approved by the RHSM, and an SC qualified at that level is present.

14.2 Respiratory Protection

(Reference Section 05.E.03, EM 385-1-1 and CH2M SOP HSE-121, *Respiratory Protection*)

14.2.1 General

Respiratory protection is not anticipated to be required at this project site based on the current scope of work. If the parameters change, or unforeseen circumstances dictate the use of respiratory protection, the following guidelines will be adhered to.

14.2.2 Voluntary Usage

CH2M has a regulatory-compliant Voluntary Usage Program for employees and workers who feel that they may want to wear a respirator, even when the situation and conditions do not require their use for protection. Any employee or worker can approach their supervisor or SSHO to have a respirator provided if so desired. Additional training and medical screening will be required to be performed in the event the user does want to wear a respirator.

14.2.3 Air Purifying Respirators

CH2M employees and subcontractors will be required to use air-purifying respirators (APRs) under the following conditions and operations:

- Operations where the concentration of substance or vapor is known
- There is a filter available that is National Institute of Occupational Safety and Health/Mine Safety and Health Administration rated for the substance or material that poses the hazard

14.2.4 Filter Selection and Change Schedule

If, during the course of the project, the situation arises that would require the use of APRs, the site safety coordinator (SSC) will contact CH2M corporate Health and Safety to acquire the appropriate atmospheric monitoring equipment to determine the type of respirator cartridges needed. Once determined, a cartridge change schedule will be established based on the analytical data collected.

14.2.5 Fit Testing

All personnel required to wear either a self-contained breathing apparatus (SCBA) or APR during the project will be fit-tested in accordance with the CH2M SOP. An operator seal check will be performed each time the respirator is placed on the operator's face for use.

Implement the following when using respiratory protection:

- Respirator users must have completed appropriate respirator training within the past 12 months. Level C training is required for the use of APRs, and Level B training is required for supplied-air respirators and SCBA use. Specific training is required for the use of powered air-purifying respirators.
- Respirator users must complete the respirator medical monitoring protocol and been approved for the specific type of respirator to be used.
- Tight-fitting facepiece respirator (negative or positive pressure) users must have passed an appropriate fit test within past 12 months.
- Respirator use shall be limited to those activities identified in this plan. If site conditions change and alter the effectiveness of the specified respiratory protection, the RHSM shall be notified to amend the written plan.
- Tight-fitting facepiece respirator users shall be clean-shaven and shall perform a user seal-check before each use.
- Canisters/cartridges shall be replaced according to the change-out schedule specified in this plan. Respirator users shall notify the SSHO or RHSM of any detection of vapor or gas breakthrough. The SSHO shall report any breakthrough events to the RHSM for schedule upgrade.
- Respirators in regular use shall be inspected before each use and during cleaning.

- Respirators in regular use shall be cleaned and disinfected as often as necessary to ensure they are maintained in a clean and sanitary condition.
- Respirators shall be properly stored to protect against contamination and deformation.
- Field repair of respirators shall be limited to routine maintenance. Defective respirators shall be removed from service.
- When breathing air is supplied by cylinder or compressor, the SSHO or RHSM shall verify the air meets Grade D air specifications.
- The SSHO or designee shall complete the Self-Assessment Checklist – Respiratory Protection included in as attachment to this plan to verify compliance with CH2M’s respiratory protection program.

Respirator Changeout Schedule

TABLE 14-2

Respirator Changeout Schedule

Contaminant	Changeout Schedule
TBD	End-of-service life or end of shift (whichever occurs first)

Worker Training and Qualification

15.1 CH2M HILL Worker Training

The intent of employee training program is to ensure that employees receive the appropriate level of training to conduct their work in a safe manner and to comply with applicable regulations. All employees are required to maintain the training qualification necessary to perform their assigned duties and job functions. (Reference CH2M SOP HSE-110, *Training*.)

15.1.1 Hazardous Waste Operations Training

All employees engaging in HAZWOPER shall receive appropriate training as required by 29 CFR 1910.120 and 29 CFR 1926.65. At a minimum, the training shall have consisted of instruction in the topics outlined in 29 CFR 1910.120 and 29 CFR 1926.65. Personnel who have not met these training requirements shall not be allowed to engage in HAZWOPER activities.

15.1.1.1 Initial Training

General site workers engaged in hazardous waste operations shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste site operations, unless otherwise noted in the above-referenced standards.

Employees who may be exposed to health hazards or hazardous substances at treatment, storage, and disposal operations shall receive a minimum of 24 hours of initial training to enable the employee to perform their assigned duties and functions in a safe and healthful manner.

Employees engaged in emergency response operations shall be trained to the level of required competence in accordance with 29 CFR 1910.120.

15.1.1.2 Three-day Actual Field Experience

General site workers for hazardous waste operations shall have received 3 days of actual experience (on-the-job training) under the direct supervision of a trained, qualified supervisor, and shall be documented. If the field experience has not already been received and documented at a similar site, the supervised experience shall be accomplished and documented at the beginning of the assignment of the project.

15.1.1.3 Refresher Training

General site workers and treatment, storage, and disposal workers shall receive 8 hours of refresher training annually (within the previous 12-month period) to maintain qualifications for fieldwork. Employees engaged in emergency response operations shall receive annual refresher training of sufficient content and duration to maintain their competencies or shall demonstrate competency in the areas at least annually.

15.1.1.4 Eight-hour Supervisory Training

Onsite management or supervisors who will be directly responsible for, or supervise employees engaged in hazardous waste site operations, will have received at least 8 hours of additional specialized training in managing such operations. Employees designated as Safety Coordinator—Hazardous Waste are considered 8-hour HAZWOPER Site Safety Supervisor-trained.

15.1.2 First-aid/Cardiopulmonary Resuscitation

First-aid and CPR training consistent with the requirements of a nationally recognized organization such as the American Red Cross Association or National Safety Council shall be administered by a certified trainer. A minimum of two personnel per active field operation will have first-aid and CPR training. Bloodborne pathogen training located on CH2M's Virtual Office is also required for those designated as first-aid/CPR trained.

15.1.3 Site Safety and Health Officer Training

SSHOs are trained to implement the HSE program on CH2M field projects. A qualified SSHO is required to be identified in the SSHSP for CH2M field projects. SSHOs must also meet the requirements of the worker category appropriate to the type of field project (construction or hazardous waste). In addition, the SSHOs shall have completed additional safety training required by the specific work activity on the project that qualifies them to implement the HSE program (for example, fall protection, excavation). All SSHO's shall also have completed 30-hour OSHA construction safety training, and have the requisite experience to oversee the tasks assigned. Furthermore, the SSHO shall have an understanding of the USACE EM385-1-1 Safety Manual.

15.1.4 Site-Specific Training

Before commencing field activities, all field personnel assigned to the project will have completed site-specific training that will address the contents of applicable HSPs, including the activities, procedures, monitoring, and equipment used in the site operations. Site-specific training will also include site and facility layout, potential hazards, risks associated with identified emergency response actions, and available emergency services. The training allows fieldworkers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and work operations for their particular activity.

15.1.5 Project-Specific Training Requirements

Project-specific training for this project includes the following:

- SSHPs/AHAs
- 3R training

15.2 Subcontractor Personnel Qualifications

All subcontractors will provide the RHSM with a list certifying the training and qualifications of competent persons and qualified operators for the following activities/equipment.

15.2.1 Competent Persons/Qualified Operators

- Excavation competent person
- Qualified equipment operator

15.2.2 Activity/Equipment List

- TBD

15.3 Project Employee Orientation

Employees expecting to access the site are required to have the project employee orientation. The training will be provided by the SSC. The training provided to the employees in the employee orientation shall include the following:

- Review the SSHP and APP
- Present an overall site safety briefing (general site safety)
- Review employee responsibilities
- Review AHA policies and procedures
- Review emergency procedures and evacuation plan
- Review injury and incident reporting procedures
- Review reporting procedures for hazardous conditions and/or hazardous activities

15.4 Personal Protective Equipment Training

OSHA requires each PPE user to receive training on the proper care, maintenance, limitations, and instructions on how to wear and adjust PPE. The proper use of PPE will also be included in project safety briefings and toolbox meetings.

15.5 Safety Meetings and Toolbox Meetings

Safety meetings provide a method for maintaining safety awareness and providing safety-related information and training to employees. Safety meetings for project supervisory personnel and project employees shall be held at least daily, and include relevant information for on- and off-the-job safety.

15.6 Activity Hazard Analysis Training

Each supervisor will review task-specific AHAs with all workers assigned to perform that task prior to the beginning of that task anywhere on the job site. All workers will sign the AHA document signifying they have been trained and understand the task steps, hazards, and hazard controls to be used.

15.7 Safety Pre-task Planning and Training

Each day, the onsite supervisors shall hold informational safety training with each member of their crew. Information discussed and training performed shall pertain to current project activities and scope of work. The subcontractor is encouraged to use the time for employee input and task-specific training.

15.8 Vendor Training

Vendors that supply equipment to the project will be required to perform a training session to review and explain the safe operation procedures to the parties that will be using or operating the equipment.

15.9 Emergency Response Plan Training

Emergency Response Plan training will occur during the employee orientation and retraining will occur periodically in safety meetings. The Emergency Response Plan training will include evacuation alarms, site evacuation, designated evacuation assembly areas, and route to emergency medical facility. Emergency drills will be performed initially, but at least twice yearly. See Section 19 for the Emergency Preparedness procedures.

15.10 Conduct of Training

15.10.1 Instructor/Trainer Requirements

All personnel who will conduct training will have documented expertise in the areas of which they will be conducting the training, and knowledge of the regulatory and other requirements. They will also be listed as a competent person in that area by the employer or contractor.

15.10.2 Initial Training

All employees will have documentation of initial training required to perform their assigned duties with their assigned tools and equipment. If previous documentation or subcontractor certification is not available, then initial training will take place onsite prior to the employee commencing work.

15.10.3 Retraining

Retraining will be required under the following conditions:

- There is a change in operations or equipment capabilities.
- An employee is seen performing an unsafe act, or operating equipment or machinery in an unauthorized manner.
- There is an incident or accident on the job site.
- Anytime the regulatory requirements require refresher training due to time periods, such as HAZWOPER, etc.

15.10.4 Demonstrated Competency

For all training conducted for equipment, machinery, or hazardous activities, the trainer will document in writing that the individual has “demonstrated competency” in the areas required to perform their assigned tasks safely and in compliance with the regulatory and other guidance.

15.11 Documentation

All training shall be documented. Documentation and certificates verifying completion will be maintained onsite by the employer, and copies of the training documentation will be submitted to the HSM. Training documentation will be made available for review at all times.

SECTION 16

Medical Surveillance and Qualification

(Reference CH2M SOP HSE-113, *Medical Surveillance*)

All site workers participating in HAZWOPER will maintain an adequate medical surveillance program in accordance with 29 CFR 1910.120 or 29 CFR 1926.65 and other applicable OSHA standards. Documentation of employee medical qualification (for example, physician's written opinion) will be maintained in the project files and made available for inspection.

16.1 Hazardous Waste Operations and Emergency Response

CH2M personnel expected to participate in onsite HAZWOPER tasks are required to have a current medical qualification for performing this work. Medical qualification shall consist of a qualified physician's written opinion regarding fitness for duty at a hazardous waste site, including any recommended limitations on the employee's assigned work. The physician's written opinion shall state whether the employee has any detected medical conditions that would place the employee at increased risk of material impairment of the employee's health from work in HAZWOPER, or from respirator use.

16.2 Job- or Site-specific Medical Surveillance

Because of the nature of hazards for a particular job or work site, specialized medical surveillance may be necessary. This surveillance could include biological monitoring for specific compounds, or specialized medical examinations. Site-specific medical surveillance includes:

- None

16.3 Respirator User Qualification

Personnel required to wear respirators must have a current medical qualification to wear respirators. Medical qualification shall consist of a qualified physician's written opinion regarding the employee's ability to safely wear a respirator in accordance with 29 CFR 1910.134.

16.4 Hearing Conservation

Personnel working in hazardous waste operations or operations that fall under 29 CFR 1910.95 and exposed to noise levels in excess of the 85 dBA time-weighted average shall be included in a hearing-conservation program that includes annual audiometric testing.

Site Control Plan

17.1 Site Control Procedures

(Reference CH2M SOP HSE-218, *Hazardous Waste Operations*)

Site control is established to prevent the spread of contamination throughout the site and to ensure that only authorized individuals are permitted into potentially hazardous areas.

The SSHO will implement site control procedures, including the following bulleted items:

- Establish support, contamination reduction, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
 - Line-of-sight and hand signals
 - Air horn
 - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the “buddy system.”

17.2 Remediation Work Area Zones

(Reference CH2M SOP HSE-218 Hazardous Waste Operations)

A three-zone approach will be used to control areas where site contaminants exist. Access will be allowed only after verification of appropriate training and medical qualification. The three-zone approach shall include an EZ, contamination reduction zone (CRZ), and a support zone (SZ). The three-zone approach is not required for construction work performed outside contaminated areas where control of site contamination is not a concern.

Specific work control zones shall be established as necessary during task planning. Site work zones should be modified in the field as necessary, based on such factors as equipment used, air monitoring results, environmental conditions, or alteration of work plans. The following guidelines shall be used for establishing and revising these preliminary zone designations.

17.2.1 Support Zone

The SZ is an uncontaminated area (trailers, offices, field vehicles, etc.) that will serve as the field support area for most operations. The SZ provides field team communications and staging for emergency response. Appropriate sanitary facilities and safety and emergency response equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged and decontaminated materials, or personnel with medical emergencies that cannot be decontaminated.

17.2.2 Contamination Reduction Zone

The CRZ is established between the EZ and the SZ, upwind of the contaminated area where possible. The CRZ provides an area for decontamination of personnel, portable handheld equipment and tools, and heavy equipment. In addition, the CRZ serves as access for heavy equipment and emergency support services.

17.2.3 Exclusion Zone

The EZ is where activities take place that may involve exposure to site contaminants and/or hazardous materials or conditions. This zone shall be demarcated to prevent unauthorized entry. More than one EZ may be established if there are different levels of protection to be employed or different hazards that exist in the same work area.

The EZ shall be large enough to allow adequate space for the activity to be completed, including field personnel and equipment, as well as necessary emergency equipment.

The EZ shall be demarcated with some form of physical barrier or signage. The physical barrier or signage shall be placed so that it is visible to personnel approaching or working in the area. Barriers and boundary markers shall be removed when no longer needed.

17.2.4 Other Controlled Areas

Other work areas may need to be controlled due to the presence of an uncontrolled hazard, to warn workers of requirements, or to prevent unauthorized entry. Examples include general construction work areas, open excavations, high noise areas, vehicle access areas, and similar activities or limited access locations. The areas shall be clearly demarcated with physical barriers (fencing, cones, reinforced caution tape, or rope) as necessary and posted with appropriate signage.

Decontamination

(Reference CH2M SOP HSE-218, *Hazardous Waste Operations*)

Decontamination areas will be established for work in potentially contaminated areas to prevent the spread of contamination. Decontamination areas should be located upwind of the exclusion zone where possible and should consider any adjacent or nearby projects and personnel. The SC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the SC. The SC must ensure that procedures are established for disposing of materials generated on the site.

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The SC should establish areas for eating, drinking, and smoking.

18.1 Contamination Prevention

Preventing or avoiding contamination of personnel, tools, and equipment will be considered in planning work activities at all field locations. Good contamination prevention and avoidance practices will assist in preventing worker exposure and result in a more efficient decontamination process. Procedures for contamination prevention and avoidance include the following:

- Do not walk through areas of obvious or known contamination.
- Do not directly handle or touch contaminated materials.
- Make sure there are no cuts or tears in PPE.
- Fasten all closures in suits and cover them with duct tape, if appropriate.
- Take particular care to protect any skin injuries.
- Stay upwind of airborne contamination, where possible.
- Do not eat or drink in contaminated work areas.
- Do not carry food, beverages, tobacco, or flame-producing equipment into contaminated work areas.
- Minimize the number of personnel and amount of equipment in contaminated areas to that necessary for accomplishing the work.
- Choose tools and equipment with nonporous exterior surfaces that can be easily cleaned and decontaminated.
- Cover monitoring and sampling equipment with clear plastic, leaving openings for the sampling ports, as necessary.
- Minimize the amount of tools and equipment necessary in contaminated areas.

18.2 Personnel and Equipment Decontamination

Personnel exiting an EZ must ensure that they are not spreading potential contamination into clean areas or increasing their potential for ingesting or inhaling potential contaminants. Personal decontamination may range from removing outer gloves as exiting the EZ, to proceeding through an outer layer doffing station, including a boot and glove wash and rinse, washing equipment, etc. Equipment that has come into contact with contaminated media must also be cleaned/decontaminated when it is brought out of the EZ.

18.3 Decontamination during Medical Emergencies

Standard personnel decontamination practices will be followed whenever possible. For emergency life-saving first-aid and/or medical treatment, normal decontamination procedures may need to be abbreviated or omitted. In this situation, site personnel shall accompany contaminated victims to advise emergency response personnel on potential contamination present and proper decontamination procedures.

Outer garments may be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Protective clothing can be cut away. If the outer garments cannot be safely removed, a plastic barrier between the individual and clean surfaces should be used to help prevent contaminating the inside of ambulances or medical personnel. Outer garments can then be removed at the medical facility.

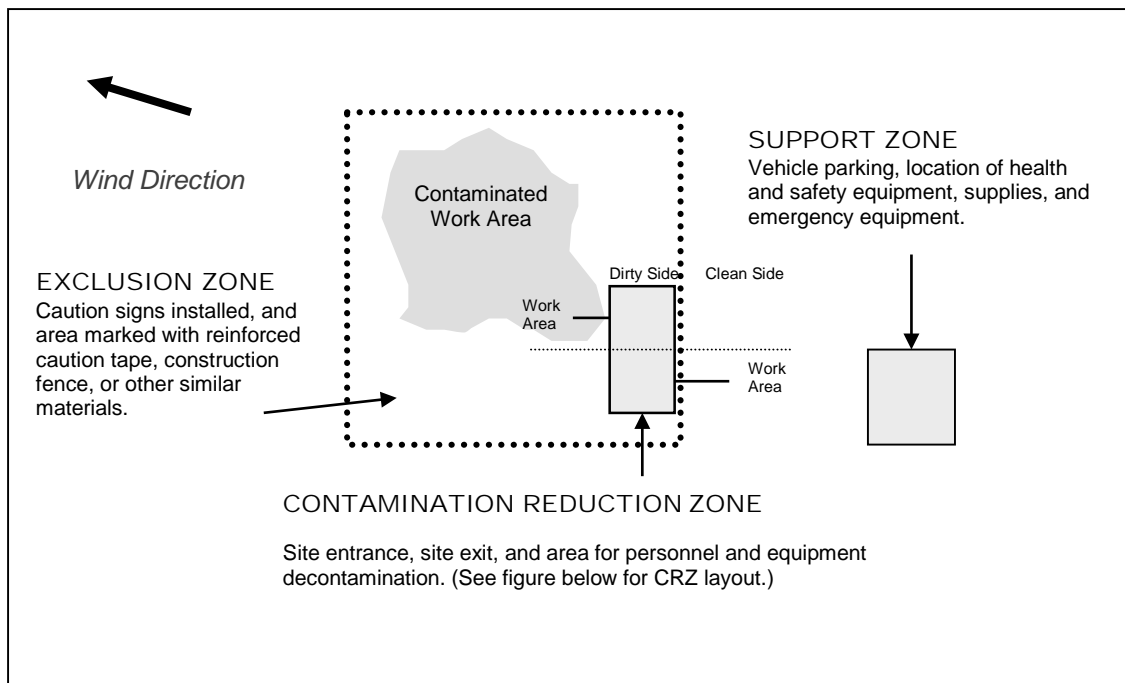
18.4 Waste Collection and Disposal

Contaminated material generated through the personnel and equipment decontamination processes (for example, contaminated disposable items, gross debris, liquids, and sludges) will be properly containerized, labeled, stored at a secure location, and disposed of in accordance with the project plans.

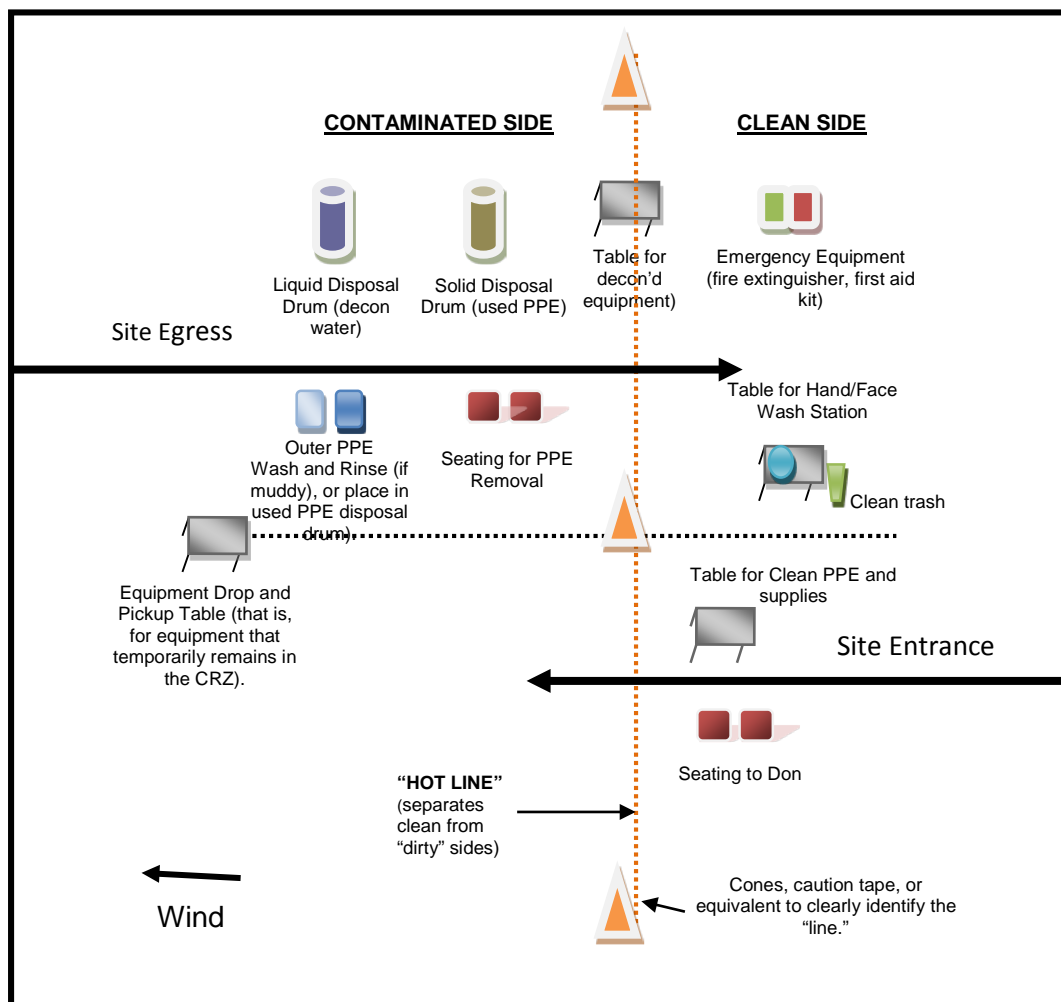
18.5 Diagram of Personnel-decontamination Line

The following figure illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the SC to accommodate task-specific requirements.

Work Area—Set-up Appropriately Based On Wind Direction



Typical Contamination Reduction Zone



Emergency Response Plan

(Reference CH2M SOP HSE-106, *Emergency Planning*)

19.1 Pre-Emergency Planning

The Emergency Response Coordinator (ERC), typically the SSHO or designee, performs the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with CH2M onsite parties, the facility, and local emergency-service providers as appropriate. Pre-Emergency Planning activities performed by the ERC include the following:

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (two-way radio and air horn).
- Determine what offsite communication equipment is needed (nearest telephone or cell phone).
- Confirm and post the “Emergency Contacts” page and route to the hospital located in this section in project trailer(s) and keep a copy in field vehicles along with evacuation routes and assembly areas. Communicate the information to onsite personnel and keep it updated.
- Field Trailers: Post “Exit” signs above exit doors, and post “Fire Extinguisher” signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to the client, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin. This may include a “tabletop” exercise or an actual drill depending on the nature and complexity of the project. Drills should take place periodically but no less than once a year.
- Brief new workers on the emergency response plan.
- The ERC will evaluate emergency response actions and initiate appropriate follow-up actions.

19.2 Emergency Equipment and Supplies

The ERC shall ensure the following emergency equipment is on the site. Verify and update the locations of this equipment as needed. The equipment will be inspected in accordance with manufacturer’s recommendations. The inspection shall be documented in a field logbook or similar means to be kept in the project files.

Emergency Equipment and Supplies	Location
20 (or two 10) class A,B,C fire extinguisher	Field vehicle
10 class A,B,C fire extinguisher	Excavator
First-aid kit	Field vehicle
Eye wash	Field vehicle
Potable water	Field vehicle

Emergency Equipment and Supplies	Location
Bloodborne-pathogen kit	Field vehicle
Additional equipment (specify): cell phone	SSC

19.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Notify appropriate response personnel.
- Shut down CH2M operations and evacuate the immediate work area.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.
- Implement HSE-111, Incident Notification, Reporting and Investigation.
- Notify and submit reports to clients as required in contract.

Small fires or spills posing minimal safety or health hazards may be controlled with onsite spill kits or fire extinguishers without evacuating the site. When in doubt evacuate. Follow the incident reporting procedures in the “Incident Notification, Reporting, and Investigation” section of this SSHP.

19.4 Emergency Medical Treatment

Emergency medical treatment is needed when there is a life-threatening injury (such as severe bleeding, loss of consciousness, breathing or heart has stopped). When in doubt, if an injury is life-threatening or not, treat it as needing emergency medical treatment.

- Notify 911 or other appropriate emergency response authorities as listed in the “Emergency Contacts” page located in this section.
- The ERC will assume charge during a medical emergency until the ambulance arrives or until the injured person is admitted to the emergency room.
- Prevent further injury, perform decontamination (if applicable) where feasible; lifesaving and first-aid or medical treatment takes priority.
- Initiate first-aid and CPR where feasible.
- Notify supervisor and if the injured person is a CH2M employee, the supervisor will call the occupational nurse at 1-866-893-2514. Make other notifications as required by HSE SOP-111, *Incident Notification, Reporting and Investigation*.
- Make certain that the injured person is accompanied to the emergency room.
- Follow the Serious Incident Reporting process in HSE SOP-111, Incident Notification, Reporting, and Investigation, and complete incident report using the HITS system on the Virtual Office or if not feasible, use the hard copy forms provided as an attachment to this SSHP.
- Notify and submit reports to client as required in contract.

19.5 Evacuation

- Evacuation routes, assembly areas, and severe weather shelters (and alternative routes and assembly areas) are to be specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the ERC or designee before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.

- The ERC and a “buddy” will remain on the site after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The ERC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The ERC will follow the incident reporting procedures in the “Incident Notification, Reporting, and Investigation” section of this HSP.

19.6 Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency; help me.
Thumbs up	OK; understood.
Grasping buddy’s wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

19.7 Firefighting Plan

(References: Section 01.E.01 & 06.A.02, EM 385-1-1 and CH2M SOP HSE-208, *Fire Prevention*)

The decision on whether or not to try to extinguish a fire using available site personnel and equipment will be made by the SSC, and is based on whether the fire is small or large, and involves explosives or flammable liquids/gases.

19.7.1.1 Location of Fire Extinguishers

Fire extinguishers will be located around the project sites as required in the following places at a minimum:

- In each vehicle
- Near areas where flammable materials are stored or in use

All fire extinguishers will be kept clearly visible, marked, and placed where they are easily accessible.

19.8 Inclement Weather

Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Field crew members performing work outdoors should carry clothing appropriate for inclement weather. Personnel are to take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed.

Protective measures during a lightning storm include seeking shelter; avoiding projecting above the surrounding landscape (don’t stand on a hilltop—seek low areas); staying away from open water, metal equipment, railroad tracks, wire fences, and metal pipes; and positioning people several yards apart. Some other general precautions include the following:

- Know where to go and how long it will take to get there. If possible, take refuge in a large building or vehicle. Do not go into a shed in an open area.
- The inclination to see trees as enormous umbrellas is the most frequent and most deadly mistake. Do not go under a large tree that is standing alone. Likewise, avoid poles, antennae, and towers.
- If the area is wide open, go to a valley or ravine, but be aware of flash flooding.
- If you are caught in a level open area during an electrical storm and you feel your hair stand on end, drop to your knees, bend forward and put your hands on your knees or crouch. The idea is to make yourself less

vulnerable by being as low to the ground as possible and taking up as little ground space as possible. Lying down is dangerous, since the wet earth can conduct electricity. Do not touch the ground with your hands.

- Do not use telephones during electrical storms, except in the case of emergency.

Remember that lightning may strike several miles from the parent cloud, so work should be stopped and restarted accordingly. The lightning safety recommendation is 30-30: Seek refuge when thunder sounds within 30 seconds after a lightning flash; and do not resume activity until 30 minutes after the last thunder clap.

High winds can cause unsafe conditions, and activities should be halted until wind dies down. High winds can also knock over trees, so walking through forested areas during high-wind situations should be avoided. If winds increase, seek shelter or evacuate the area. Proper body protection should be worn in case the winds hit suddenly, because body temperature can decrease rapidly.

19.8.1 Tornado Safety

Recognizing imminent tornado signs include seeing an unusually dark sky, possibly with some green or yellow clouds. You may hear a roaring or rumbling sound like a train, or a whistling sound like a jet. Large hail may also be falling. You may be able to see funnels, or they may be hidden by rain or hail.

Listen to your radio for tornado warnings during bad thunderstorms. If a tornado warning is issued, don't panic. Instead, listen and look. Quickly but calmly follow directions for getting to shelter.

Take cover. Indoors, you should go down into the basement and crouch down under the stairs, away from windows. Do not take an elevator. If you can't get to a basement, go into a closet or bathroom and pull a mattress over you or sit underneath a sturdy piece of furniture on the ground floor near the center of the building. Pull your knees up under you and protect your head with your hands.

A bad place to be in a tornado is in a building with a large freestanding roof such as a gymnasium, arena, auditorium, church, or shopping mall. If you are caught in such a building, take cover under something sturdy.

More than half of tornado deaths occur in mobile homes. If a tornado threatens, get out and go to a building with a good foundation, or lay down in a ditch away from vehicles and other objects.

If you are driving, get to a shelter, lie down in a ditch or seek cover up under the girders of an overpass or bridge. Stay as close to the ground as you can. Protect your head and duck from flying debris.

Stay away from metal and electrical equipment because lightning accompanies tornadoes.

If you have time before the tornado strikes, secure objects such as garbage cans and lawn furniture which can injure people. While most tornado damage is a result of the violent winds, most injuries and deaths actually result from flying debris.

Emergency Contacts

24-hour CH2M HILL Injury Reporting – 1-866-893-2514

24-hour CH2M HILL Serious Incident Reporting Contact – 720-286-4911

Medical Emergency

Naval Support Facility – Indian Head

(301) 744-4333 *

If in restricted area, use red call boxes – no cell phone usage in restricted area!***Identify name, nature of your emergency and exact location.****NAVFAC POC:**

Joseph Rail: (202) 685-3105

Joseph.Rail@navy.mil, NAVFAC Washington Remedial Project Manager

CH2M Medical Consultant

WorkCare

Dr. Peter Greaney, M.D.

300 S. Harbor Blvd, Suite 600

Anaheim, CA 92805

800-455-6155/866-893-2514

714-978-7488

Fire/Spill Emergency – (301) 744-4333 ***If in restricted area, use red call boxes – no cell phone usage in restricted area!*****Identify name, nature of your emergency and exact location.****CH2M Director – Health, Safety, Security & Environment**

Andy Strickland/DEN

(720) 480-0685 (cell) or (720) 286-2393 (office)

Security & Police – (301) 744-4333 ***If in restricted area, use red call boxes – no cell phone usage in restricted area!*****Identify name, nature of your emergency and exact location.****CH2M Responsible Health and Safety Manager (RHSM)**

Name: Mark Orman

Phone: w 865-560-2825, c 414-712-4138

Utilities Emergency Phone Numbers**On base: Nicholas Carros****Phone: 301-744-2263****CH2M Human Resources Department**

Phone: Employee Connect toll-free number

1-877-586-4411

(U.S. and Canada)

CH2M Project Manager

Name: Margaret Kasim

Phone: 703-376-5154

CH2M Worker's Compensation:

Contact Business Group Human Resources dept. to have form completed

CH2M Safety Coordinator (SC)

Name: Nelson Figeac

Phone: (757) 288-0374 cell

Media Inquiries Corporate Strategic Communications

Name: John Corsi

Phone: (720) 286-2087

CH2M Project Environmental Manager (EM)

Name: Hope Wilson

Phone: +1 (678) 530-4226

Automobile Accidents

Mary Ellegood-Oberts/DEN (720-286-2291)

See vehicle accident guidance document attached

Federal Express Dangerous Goods Shipping

Phone: 800/238-5355

CHEMTEL (hazardous material spills)**Phone: 800/255-3924****Facility Alarms:**

Sound vehicle horn three times. (UXO 20)

Air raid horn type siren (NSFIH facility)

Evacuation Assembly Area(s): TBD daily by SC based on predominant wind direction

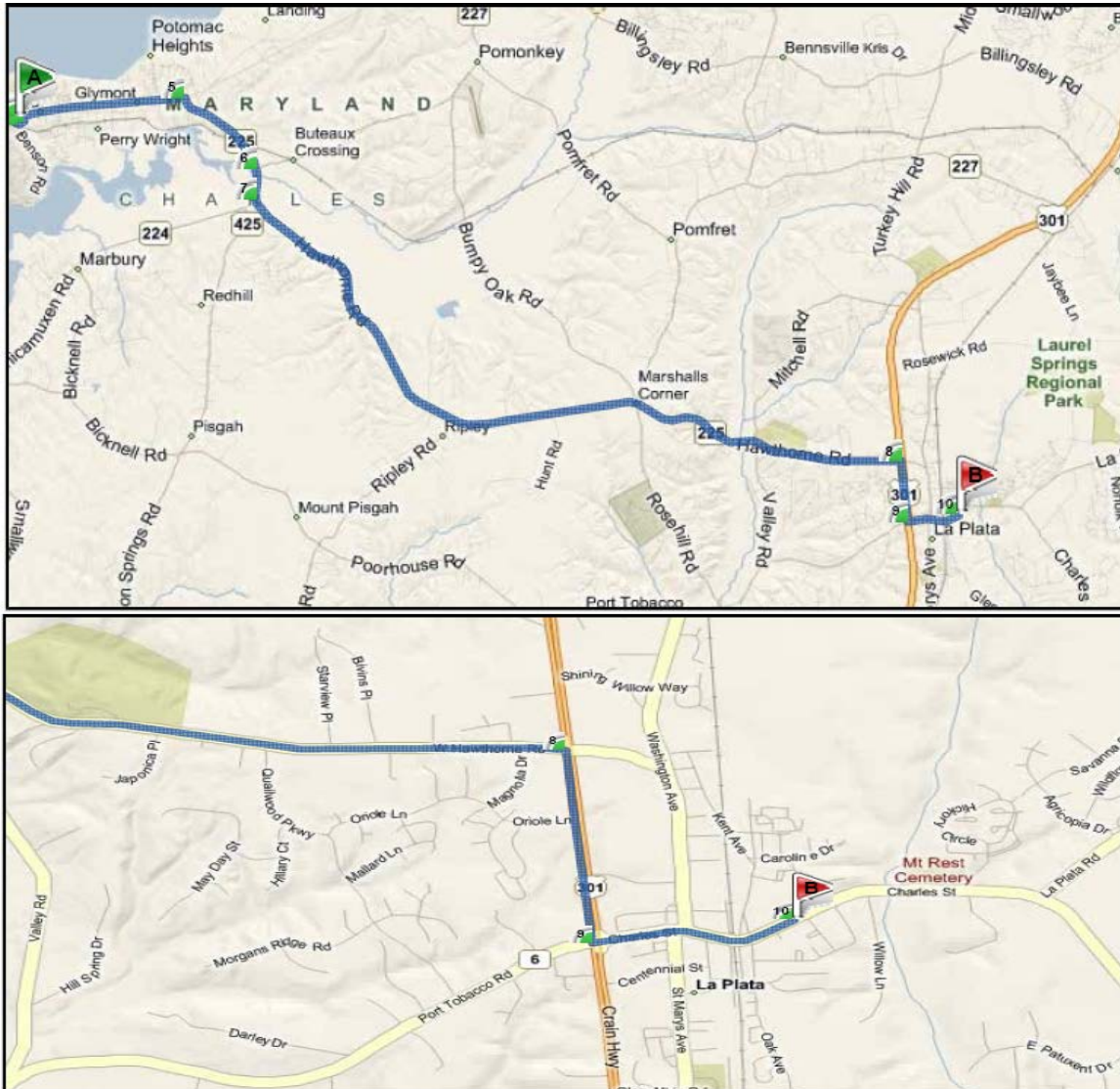
Facility/Site Evacuation Route(s): TBD daily by SC based on predominant wind direction

Directions to Local Hospital**Local Hospital****Civisita Medical Hospital, 701 Charles Drive, La Plata, MD 20646 (301)-609-4000**

Hospital Route Map - NSFIH to Civista Medical Center, 701 Charles Drive, La Plata, MD **(301)-609-4000**

Directions to Hospital

(Total distance about 14 miles @ ~ 26 minutes)



Directions	Distance
1) From Map Point A (4050 Indian Head Way - Indian Head, MD Post Office) depart on SR-210 South (Indian Head Highway) toward Mattingly Ave and turn LEFT on East Mattingly Ave	~ 0.2 mile
2) Turn LEFT on Town St and then immediately turn RIGHT onto SR-210 North (Indian Head Highway)	~ 1.9 miles
3) Turn Right (south) on SR-225/Hawthorne Road	~ 1.2 miles
4) Keep Straight onto SR-224/SR-225/Hawthorne Road	~ 0.4 mile
5) Bear Left (southeast) on SR-225, Hawthorne Road	~ 9.0 miles
6) Turn Right (south) onto US-301 South (Crane Highway.)	~ 0.7 mile
7) Turn Left (East) on SR-6 then stay straight on SR-6 (East Charles Street)	~ 0.6 mile
8) Arrive at Civista Medical Center, 701 Charles Drive, La Plata, MD	0 feet

Spill Containment Procedures

CH2M and subcontractor personnel working at the project site shall be knowledgeable of the potential health, safety, and environmental concerns associated with petroleum and other substances that could potentially be released at the project site.

The following is a list of criteria that must be addressed in CH2M's or the subcontractor's plans in the event of a spill or release. In the event of a large-quantity spill, notify emergency services. Personnel discovering a spill shall (only if safe to do so):

- Stop or contain the spill immediately (if possible) or note source. Shut off the source (for example, pump, treatment system) if possible. If unsafe conditions exist, then leave the area, call emergency services, inform nearby personnel, notify the site supervisors, and initiate incident reporting process. The SSHO shall be notified immediately.
- Extinguish sources of ignition (flames, sparks, hot surfaces, or cigarettes).
- Clear personnel from the spill location and barricade the area.
- Use available spill control equipment in an effort to ensure that fires, explosions, and releases do not occur, recur, or spread.
- Use sorbent materials to control the spill at the source.
- Construct a temporary containment dike of sorbent materials, cinder blocks, bricks or other suitable materials to help contain the spill.
- Attempt to identify the character, exact source, amount, and extent of the released materials. Identification of the spilled material should be made as soon as possible so that the appropriate cleanup procedure can be identified.
- Contact the RHSM and project EM in the event of a spill or release immediately so evaluation of reportable quantity requirements and whether agency reporting is required.
- Assess possible hazards to human health or the environment as a result of the release, fire or explosion.
- Follow incident notification, reporting, and investigation section of this plan.

Inspections

21.1 Management Health, Safety, Security, and Environment Inspections

The Management Inspection Checklist (attached to this plan) is intended to facilitate PM leadership, provide an opportunity for PM's to mentor field staff on HSE and identify any big picture actions that need to be addressed. Observations that would improve global HSE program should also be included on the form. This checklist does NOT take the place of a formal HSE audit. The PM shall:

- Complete one checklist per month during fieldwork when visiting the site. The PM may delegate completion to the task lead, field team leader, or construction manager if the project is short duration and a visit is not planned for.
- Complete applicable sections of the checklist (can be typed or hand-written). Address issues with the field team, taking the opportunity to mentor staff by identifying the "root cause" of observation (for example, why are safe behavior observations not being completed, had this hazard been noted by any other team members?).
- Send completed form to Project Delivery Manager, Sector HSE Lead, and RHSM for tracking and review. Original should be kept in the project files.

21.2 Project Activity Self-assessment Checklists

In addition to the hazard controls specified in this document, Project Activity Self-assessment Checklists are contained as an attachment to this SSHP. The Project Activity Self-assessment Checklists are based upon minimum regulatory compliance and some site-specific requirements may be more stringent. The objective of the self-assessment process is to identify gaps in project safety performance, and prompt for corrective actions in addressing these gaps. The self-assessment checklists, including documented corrective actions, shall be made part of the permanent project records and maintained by the SSHO.

The self-assessment checklists will also be used by the SSHO in evaluating the subcontractors and any client contractors' compliance onsite.

The self-assessment checklists for the following tasks and exposures are required when the task or exposure is initiated and weekly thereafter while the task or exposure is taking place. The checklists shall be completed by the SSHO or other CH2M representative and maintained in project files.

- Earthmoving Equipment
- Excavation
- Hand and Power Tools
- Lifting

21.3 Safe Behavior Observations

Safe behavior observations (SBOs) are a tool to be used by supervisors to provide positive reinforcement for work practices performed correctly, while also identifying and eliminating deviations from safe work procedures that could result in a loss.

The SSHO or designee shall perform at least one SBO each week for any fieldwork performed by subcontractors or when there are at least two CH2M personnel performing fieldwork.

The SSHO or designee shall complete the SBO form (attached to this SSHP) for the task/operation being observed and submit them weekly.

For federal projects, SBOs may be submitted electronically by e-mailing them to the address, "CH2M HILL ES FED Safe Behavior Observations," when connected to the network or at CH2MHILLESFEDSafeBehaviorObservation@ch2m.com.

21.4 Deficiency Tracking System

21.4.1 Safe Behavior Observation Forms

All observed hazard forms will be completed onsite at the time of the observed hazard, or activity inspection. Both good behaviors and questionable or unsafe behaviors will be annotated on the form and discussed with the observed worker(s). Any unsafe behavior or acts observed will be documented in writing to the subcontractor's project manager for action. All observed hazard forms will become a permanent part of the project files.

21.4.2 Self-assessment Checklists

Any item that is annotated with a "NO" must be explained on the last sheet of the checklist, and followed up for corrective action. The last page of each checklist has a column for recording the date the deficiency was corrected. The self-assessment checklists—once completed and signed by the inspector, reviewed with the applicable supervisor and/or employee, and signed by the project manager—will become a permanent record of inspection and part of the project files.

21.4.3 Open Deficiencies

All self-assessment checklists with open deficiencies or stop work orders will be the top priority for the SSC each work day to ensure they are corrected, any training accomplished, or the situation corrected to close out the deficiency. If the deficiency is not handled in a timely manner, the SSC will report the problem in writing to the prime contractor PM.

A copy of the Safety and Occupational Health deficiency tracking log shall be mounted on or be adjacent to the bulletin board or a notice on the bulletin board shall state the location where it may be accessed by all workers upon request. See Attachment 12 for the form.

Incident Notification, Reporting, and Investigation

(Reference CH2M SOP HSE-111, Incident Notification, Reporting and Investigation)

22.1 General Information

This section applies to the following:

- All injuries involving employees, third parties, or members of the public
- Damage to property or equipment
- Interruptions to work or public service (hitting a utility)
- Incidents that attract negative media coverage
- Near misses
- Spills, leaks, or regulatory violations
- Motor vehicle accidents

Documentation, including incident reports, investigation, analysis, and corrective measure taken shall be kept by the SSHO and maintained onsite for the duration of the project.

22.2 Section Definitions

Incident: An incident is an event that causes or could have caused undesired consequences. An incident may be caused by natural forces, employees, subcontractors, or third parties in any location associated with CH2M operations, including offices, warehouses, project sites, private property, or public spaces. Incidents include the following:

- Injury or illness to a CH2M employee or subcontractor employee, or member of the public
- Property damage
- Spill or release
- Environmental requirement or permit violation
- A “near-miss”
- Other (for example, fire, explosion, bomb threat, workplace violence, threats)

Accident: An accident involves actual loss through injury, damage to assets, or environmental harm.

Near Miss: A near-miss occurs when an intervening factor prevented an injury or illness, property damage, spill or release, permit violation, or other event from occurring. Examples of near-miss situations include the following: a hard hat or other PPE prevented an injury; secondary containment or emergency shutoff prevented a spill; or an alert coworker prevented an incident.

Serious Incident: A serious incident must be immediately reported to senior management includes the following:

- Work-related death, or life threatening injury or illness of a CH2M employee, subcontractor, or member of the public
- Kidnap/missing person
- Acts or threats of terrorism
- Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$500,000 in damage
- Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community, or the environment

22.3 Reporting Requirements

All employees and subcontractors' employees shall immediately report any incident (including "near misses," as defined in the section above) in which they are involved or witness to their supervisor.

The CH2M or subcontractor supervisor, upon receiving an incident report, shall inform his immediate superior and the CH2M SSHO.

The SSHO shall immediately report the following information to the RHSM and PM by phone and e-mail:

- Project name and site manager
- Date and time of incident
- Description of incident
- Extent of known injuries or damage
- Level of medical attention
- Preliminary root cause/corrective actions

If the incident was an environmental permit issue (potential permit noncompliance, other situation that result in a notice of violation) or a spill or release, contact the Project EM immediately so evaluation of reportable quantity requirements and whether agency reporting is required;

The CH2M team shall comply with all applicable statutory incident reporting requirements such as those to OSHA, the police, or state federal environmental agency.

Be aware that many OSHA-designated states require reporting to the area OSHA office if one person is admitted to the hospital (for example, California and Washington); whereas, federal OSHA requires it if three or more are admitted.

22.4 HITS System and Incident Report Form

CH2M maintains a HITS entry and/or Incident Report Form (IRF) for all work-related injuries and illnesses sustained by its employees in accordance with recordkeeping and insurance requirements. A HITS entry and/or IRF will also be maintained for other incidents (property damage, fire, or explosion, spill, release, potential violation, and near misses) as part of our loss prevention and risk reduction initiative.

The SSHO shall complete an entry into the HITS database system located on CH2M's Virtual Office (or if Virtual Office is not available, use the hard copy Incident Report Form and Root Cause Analysis Form and forward it to the RHSM) within 24 hours and finalize those forms within 3 calendar days.

22.5 Injury Management/Return-to-Work (for U.S./Puerto Rico-based CH2M HILL Staff Only)

(Reference CH2M, SOP HSSE-124, Injury Management/Return-to-Work)

22.5.1 Background

The Injury Management Program has been established to provide orderly, effective, and timely medical treatment and return-to-work transition for an employee who sustains a work-related injury or illness. It also provides guidance and assistance with obtaining appropriate treatment to aid recovery, keep supervisors informed of employee status, and to quickly report and investigate work-related injury/illnesses to prevent recurrence.

To implement the Injury Management/Return-to-Work Program successfully, supervisors and/or SC should:

- Ensure employees are informed of the Injury Management/Return-to-Work Program.
- Become familiar with the Notification Process (detailed below).
- Post the Injury Management/Return-to-Work Notification Poster.

22.5.2 The Injury Management/Return-to-Work Notification Process:

- Employee informs their supervisor.
- Employee calls the Injury Management Program toll free number 1-866-893-2514 immediately and speaks with the Occupational Injury Nurse. This number is operable 24 hours per day, 7 days a week.
- Supervisor ensures employee immediately calls the Injury Management Program number. Supervisor makes the call with the injured worker or for the injured worker, if needed.
- Nurse assists employee with obtaining appropriate medical treatment, as necessary, schedules clinic visit for employee (calls ahead, and assists with any necessary follow up treatment). The supervisor or SC accompanies the employee if a clinic visit is necessary to ensure that employees receive appropriate and timely care.
- Supervisor or SC completes the HITS entry or Incident Report Form immediately (within 24 hours) and forwards it to the PM and RHSM.
- Nurse notifies appropriate CH2M staff by e-mail (Supervisor, Health & Safety, Human Resources, Workers' Compensation).
- Nurse communicates and coordinates with and for employee on treatment through recovery.
- Supervisor ensures suitable duties are identified and available for injured or ill workers who are determined to be medically fit to return to work on transitional duty (temporary and progressive).
- Supervisor ensures medical limitations prescribed (if any) by physician are followed until the worker is released to full duty.

22.6 Serious Incident Reporting Requirements

(Reference CH2M SOP HSE-111, Incident Reporting, Notification and Investigation)

The serious incident reporting requirements ensures timely notification and allows for positive control over flow of information so that the incident is handled effectively, efficiently, and in conjunction with appropriate corporate entities. This standard notification process integrates Health, Safety, Security, and Environment and Firm-Wide Security Operations requirements for the consistent reporting of and managing of serious events throughout our operations.

22.6.1 Serious Incident Determination

The following are general criteria for determining whether an incident on CH2M owned or managed facilities or program sites is considered serious and must be immediately reported up to Group President level through the reporting/notification process:

- Work-related death, or life threatening injury or illness of a CH2M employee, subcontractor, or member of the public
- Kidnap or missing person
- Acts or threats of terrorism
- Event that involves a fire, explosion, or property damage that requires a site evacuation or is estimated to result in greater than \$ 500,000 in damage
- Spill or release of hazardous materials or substances that involves a significant threat of imminent harm to site workers, neighboring facilities, the community, or the environment

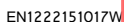
22.6.2 Serious Incident Reporting

If an incident meets the “Serious Incident” criteria, the PM is to immediately contact the Crisis Manager at 720-286-4911, then follow the standard incident reporting procedure.

For all serious incidents this standard reporting process is implemented immediately so as to ultimately achieve notification to the Business Group President within 2 hours of incident onset or discovery, and notification to appropriate corporate Crisis Management Support Team.

Major accidents include any occupational hazard exposure or physical injury that requires more than basic first-aid (physical injury/exposure) or fire, explosion, or property damage exceeding \$200,000. Major accidents require immediate notification of appropriate personnel as discussed below and must be done within 24 hours to the Contracting Officer/Representative.

In the event of an injury that constitutes an OSHA-recordable incident, the SSHO will notify the Navy Remedial Project Manager (RPM), Navy Resident Officer in Charge of Construction (ROICC), PM, Compliance Safety and Health Officer, and HSM as soon as practical after the incident. The reporting form shall be Contractor Safety Incident Report, found in Attachment 13.



22.7 Incident Root Cause Analysis

The accident analysis is essential if all causes of the incident are to be identified for the correct remedial actions to be taken to prevent the same and similar type of incident from recurring. Root Cause Analysis (RCA) shall be completed for all recordable injuries, property damage incidents in excess of \$5000.00 (US), environmental permit violations, spills and releases that are required to be reported to regulatory agencies, and any other incident, including near misses where they RHSM or PM determines an RCA is appropriate. The RHSM/Responsible Environmental Manager is responsible for ensuring it is completed and results entered in the incident report form in HITS. RCA's must be completed using a team that includes, at least the RHSM or designee, the involved party(ies), a responsible operations representative (for example, PM, construction manager, crew supervisor, etc.) and an independent management representative not associated with the incident.

The Root Cause Analysis Form must be completed for all Loss Incidents and Near Loss Incidents. The form must be submitted to the investigation team for review.

For minor losses or near losses, the information may be gathered by the supervisor or other personnel immediately following the loss. Based on the complexity of the situation, the information may be all that is necessary to enable the investigation team to analyze the loss, determine the root cause, and develop recommendations. More complex situations may require the investigation team to revisit the loss site or re-interview key witnesses to obtain answers to questions that may arise during the investigation process.

Photographs or videotapes of the scene and damaged equipment should be taken from all sides and from various distances. The point is especially important when the investigation team will not be able to review the loss scene.

The investigation team must follow the Root Cause Analysis Flow Chart (see Attachment 4 of the SOP) to assist in identifying the root cause(s) of a loss. Any loss may have one or more root causes and contributing factors. The root cause is the primary or immediate cause of the incident, while a contributing factor is a condition or event that contributes to the incident happening, but is not the primary cause of the incident. Root causes and contributing factors that relate to the person involved in the loss, his or her peers, or the supervisor should be referred to as "personal factors." Causes that pertain to the system within which the loss or injury occurred should be referred to as "job factors."

Personal factors include the following:

- Lack of skill or knowledge
- Correct way takes more time and/or requires more effort
- Short-cutting standard procedures is positively reinforced or tolerated
- Person thinks there is no personal benefit to always doing the job according to standards

Job factors include the following:

- Lack of or inadequate operational procedures or work standards
- Inadequate communication of expectations regarding procedures or standards
- Inadequate tools or equipment

The root cause(s) could be any one or a combination of these seven possibilities or some other uncontrollable factor. In the vast majority of losses, the root cause is very much related to one or more of these seven factors. Uncontrollable factors should be used rarely and only after a thorough review eliminates all seven other factors.

22.7.1 Corrective Actions

Include all corrective actions taken or those that should be taken to prevent recurrence of the incident. Include the specific actions to be taken, the employer and personnel responsible for implementing the actions, and a timeframe for completion. Be sure the corrective actions address the causes.

Once the investigation report has been completed, the PM shall hold a review meeting to discuss the incident and provide recommendations. The responsible supervisors shall be assigned to carry out the recommendations, and shall inform the SSHO upon successful implementation of all recommended actions.

- Evaluation and follow-up of the IRF will be completed by the type of incident by the RHSM or EM.
- Incident investigations must be initiated and completed as soon as possible but no later than 72 hours after the incident.

Records and Reports

An organized project filing system is essential for good documentation and recordkeeping. The following are some of the many benefits to an organized filing system:

- Other CH2M employees can easily and quickly find documents
- Records are readily available for review
- Records may be needed during OSHA investigations, audits, or other legal matters
- Records may be needed on short notice in case of an accident, illness, or other emergency
- Systematic recordkeeping aids in overall project organization

The project filing system shall be established at the beginning of the project and maintained throughout all phases of construction and archived in accordance with CH2M's Records Retention Policy. The information contained in the filing system shall be updated regularly and/or as specified in this document. The PM and SC are responsible for collecting documentation, including subcontractor documentation, and maintaining a complete and organized filing system.

Below are examples of records that must be maintained as the project progresses:

- Exposure records includes air monitoring data (including calibration records), MSDSs, and exposure modeling results
- Physical hazard exposure records include noise, ionizing radiation, non-ionizing radiation, vibration, and lasers exposure assessments and measurements
- Respiratory fit test records
- Training records
- Incident reports, investigations and associated back-up information such as agency notifications, calculations, and corrective actions taken
- Federal or state agency inspection records
- Other records:
 - Ergonomic evaluations
 - HSE audits and assessments
 - Project-specific HSE plans
 - Confined space entry permits
 - Equipment inspections
 - Equipment maintenance
 - Emergency equipment inspection records
 - SBOs
 - Self-assessment checklists
- The RHSM shall coordinate with the PM or designee to ensure that final project-specific HSE records described in this section, including negative exposure determinations, are maintained with the project files in accordance with the CH2M records retention schedule, or forwarded to the Medical Surveillance Program Administrator, as appropriate. Records retention requirements are detailed in the Recordkeeping and Access to Records SOP, HSE-119.

CH2M HILL Health and Safety Plan

Attachment 1

Health and Safety Plan Employee Signoff Form

EMPLOYEE SIGNOFF FORM

Health and Safety Plan

The CH2M HILL project employees and subcontractors listed below have been provided with a copy of this HSP, have read and understood it, and agree to abide by its provisions.

Project Name:

Project Number:[illegible]

CH2M HILL Health and Safety Plan

Attachment 2

Chemical Inventory/Register Form



CHEMICAL INVENTORY/REGISTER FORM

Refer to SOP HSE-107, Attachment 1, for instructions on completing this form.

Location:

HCC:

☐ Office

☐ Warehouse

☐ Laboratory

☐ Project:

Project No.:

Regulated Product	Location	Container labeled (✓if yes)	MSDS available (✓if yes)

MSDS for the listed products will be maintained at:

CH2M HILL Health and Safety Plan

Attachment 3

Chemical-specific Training Form



CHEMICAL-SPECIFIC TRAINING FORM

Refer to SOP HSE-107 Attachment 1 for instructions on completing this form.

Location:

Project # :

HCC:

Trainer:

TRAINING PARTICIPANTS:

NAME	SIGNATURE	NAME	SIGNATURE

REGULATED PRODUCTS/TASKS COVERED BY THIS TRAINING:

The HCC shall use the product MSDS to provide the following information concerning each of the products listed above.

- ☐ Physical and health hazards
- ☐ Control measures that can be used to provide protection (including appropriate work practices, emergency procedures, and personal protective equipment to be used)
- ☐ Methods and observations used to detect the presence or release of the regulated product in the workplace (including periodic monitoring, continuous monitoring devices, visual appearance or odor of regulated product when being released, etc.)

Training participants shall have the opportunity to ask questions concerning these products and, upon completion of this training, will understand the product hazards and appropriate control measures available for their protection.

Copies of MSDSs, chemical inventories, and CH2M HILL's written hazard communication program shall be made available for employee review in the facility/project hazard communication file.

CH2M HILL Health and Safety Plan

Attachment 4

Project Activity Self-assessment Checklists/Permits/Forms

Heat stress physiological monitoring form

Biological Prevention

Earthmoving Equipment

Excavations

Hand and Power Tools

Manual Lifting

HEAT STRESS PHYSIOLOGICAL MONITORING FORM

Project:

Date:

Company:

1. Take and record measurement of temperature or pulse at the frequency indicated in the safety plan.
2. Follow the Physiological Monitoring Protocol in the safety plan.
3. Never continue work if your body temperature is more than 100.4° F/38° C, or if you are experiencing sudden and severe fatigue, nausea, dizziness, or lightheadedness.

Employee:

Describe action taken below if measurements are exceeded:

Time

Temp

Pulse

Employee:

Describe action taken below if measurements are exceeded:

Time

Temp

Pulse

Employee:

Describe action taken below if measurements are exceeded:

Time

Temp

Pulse

Employee:

Describe action taken below if measurements are exceeded:

Time

Temp

Pulse

Employee:

Describe action taken below if measurements are exceeded:

Time

Temp

Pulse

<div>CH2MHILL</div> <div>Health and Safety Field Change Request (FCR)</div>			
Date of Change:			
FCR No. (assigned by RHSM):			
Applicable Health and Safety Plan Title:			
Project Number:		Project Name & Location:	
Subject of Change:			
Recommended Change:			
Reason for Change:			
Submitted by:		Company: CH2M HILL	Date:
Review & Acceptance:			
Project Manager:		Date:	
Health & Safety Mgr:		Date:	
Distribution:			
1.	2.	3.	4.
5.	6.	7.	8.

File Copies: Project File

Project Health and Safety Field Change Request Log

INSERT PROJECT NAME

[illegible]

Management Health, Safety, Security and Environment Inspection

Program/Project Name: _____

Work Being Performed: _____

Management Inspector: _____

Project Number: _____

Date: _____

Sector: _____

1. Job Information/Postings	A	C	I	N/A	Comments/Corrective Action(s)
a. Required postings in place (OSHA/State/Country)					
b. Emergency Contacts and Phone list posted					
c. Directions and map to hospital posted					
d. Incident Reporting Flow Chart posted					
2. HSSE Documentation					
a. HASP current (within 1 year), onsite, and signed					
b. AHAs available for all work and reviewed/signed					
c. Daily Pre-Task Safety Plan/Meeting completed					
d. SBO's completed weekly and emailed					
e. Self-Assessment checklists completed per HASP					
f. Environmental Plan available					
g. Emergency drill completed and documented					
h. E Permit compliance assurance measures documented					
i. HSE training up to date and documented					
3. Housekeeping/First Aid					
a. Work areas clean and organized					
b. Fire extinguisher, eye wash, 1 st aid/BBP kit in place					
c. Materials and waste labeled and in closed containers					
4. PPE and Air Monitoring					
a. PPE being worn as specified in HASP/AHA					
b. Air monitoring done per HASP and documented					
5. Heavy Equipment and Construction Operations					
a. Documentation of Competent/Qualified Operators					
b. Back-up alarms audible & no cell phone use					
c. High-visibility vests on ground personnel					
d. Daily inspections completed and documented					
e. Windshields/mirrors OK and seat belts worn					
6. Excavation, Trenching, and Land Disturbing Activities					
a. Competent person identified					
b. Daily inspection completed prior to entry					
c. Proper setup (sloping, shoring, exits, spoils)					
d. 3 rd party Utility Locate service used					
d. Storm water PPP and inspections/sampling conducted					
d. Erosion/sediment controls and dust controls in place					
7. Hand Tools					
a. Hand tools inspected prior to use					
b. Guards in place on tools					
c. Right tool for the job at hand					
8. Electrical					
a. All electrical cords, prongs, receptacles OK					
b. GFCI used on all circuits					
c. No energized electrical work incl. voltage testing					
d. Written Lockout Tagout system in use					

(Column - A=Adequate, C=Needs Consideration, I=Needs Immediate Action, N/A= Not Applicable or Not Assessed)

9. Ladders and Scaffolds	A	C	I	N/A	Comments/Corrective Action(s)
a. Ladders extend 36" above the landing and secured					
b. Ladders selected and used properly					
c. Scaffold planked, unaltered, and in good condition					
d. Scaffold/ladder users trained in inspection and use					
10. Hot Work					
a. Gas cylinders stored upright and secured					
b. Minimum 20' distance between fuels and oxygen					
c. PPE in use per HASP/AHA					
d. Fire watch in place w/adequate fire extinguishers					
11. Cranes					
a. Outriggers extended, swing radius protected					
b. Operator CCO licensed, competent person for rigging					
c. Annual certified crane inspection					
d. Chains and slings inspected, have rating tag					
e. Suspended load tag lines - no one underneath					
12. Drill Rigs					
a. Overhead electrical clearance adequate					
b. Daily inspections completed and available					
c. Emergency shut off functioning					
d. 3 rd party Utility Locate service used					
13. Hazard Communication and Chemical Use					
a. MSDS's present for all chemicals					
b. Chemical Inventory current and in HSP or on file					
c. Hazard communication briefing for all chemicals					
d. All chemicals labeled/stored as required					
e. SPCC Plan implemented for >1320 gals fuels/oils on site					
14. Fall Protection					
a. Full body harness worn properly, workers tied off over 6'					
b. Guard rails 42" high					
15. Material Handling					
a. Proper body positioning					
b. Objects less than 40 lbs. for one person lift					
16. Site Control					
a. Work Zones delineated, necessary signage in place					
b. Decontamination method is adequate					
17. Waste and Hazardous Materials Management					
a. Waste Tracking Log					
b. Hazardous waste onsite for <90 days					
c. Containers labeled, inspections conducted/documentated					
d. HW manifests signed, tracked, copies kept on site					
e. HW Transporters trained and licensed, placards used					
18. Security and Emergency Planning					
a. Emergency coordinator designated					
b. Severe weather plans/controls in place					
c. Security plan/measures adequate					
19. Demolition					
a. ACM and Hazardous Materials Survey					
b. Asbestos/Lead based paint work approved per policy					

(Column - A=Adequate, C=Needs Consideration, I=Needs Immediate Action, N/A= Not Applicable or Not Assessed)

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: 1) CH2M HILL employees are potentially exposed to the hazards of earthmoving equipment operations, 2) CH2M HILL employees are operating earthmoving equipment, and/or 3) CH2M HILL provides oversight of a subcontractor operating earthmoving equipment.

The CH2M HILL Safety Coordinator may consult with subcontractors operating earthmoving equipment when completing this checklist, but shall not direct the means and methods of equipment operations nor direct the details of corrective actions. Earthmoving equipment subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: _____ Project No.: _____
Location: _____ PM: _____
Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

- ☐ Evaluate CH2M HILL employee exposures to earthmoving equipment hazards (complete Section 1).
- ☐ Evaluate CH2M HILL employees operating earthmoving equipment (complete entire checklist).
- ☐ Evaluate CH2M HILL subcontractor's compliance with earthmoving equipment safety requirements (complete entire checklist). Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the earthmoving equipment subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-306.

SAFE WORK PRACTICES (5.1)**SECTION 1****Yes No N/A N/O**

1. Personnel maintaining safe distance from operating equipment
2. Positioning personnel in close proximity to operating equipment is avoided
3. Personnel wearing high-visibility and/or reflective vests when close to operating equipment
4. Personnel approach operating equipment safely
5. Personnel riding only in seats of equipment cab and using seat belts
6. Personnel not positioned under elevated portions of equipment
7. Personnel not positioned under hoisted loads
8. Personnel not hoisted by equipment
9. Personnel do not to approach equipment that has become electrically energized
10. Personnel wearing appropriate PPE, per HSP/FSI

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

EQUIPMENT SAFETY REQUIREMENTS PRIOR TO OPERATING EQUIPMENT (5.2.1)	<u>SECTION 2</u>	Yes	No	N/A	N/O
11. Only qualified and authorized personnel operating equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Daily safety briefing/meeting conducted with equipment operators		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Daily inspection of equipment conducted and documented		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Modifications and attachments used approved by equipment manufacturer		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Backup alarm or spotter used when backing equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Operational horn provided on bi-directional equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Seat belts are provided and used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Rollover protective structures (ROPS) provided		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Braking system capable of stopping full payload		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Headlights and taillights operable when additional light required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Brake lights in operable condition		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Cab glass provides no visible distortion to the operator		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. All machine guards are in place		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Hauling equipment (dump trucks) provided with cab shield or canopy		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Dump truck beds provided with positive means of support during maintenance or inspection		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Dump truck operating levers provided with latch to prevent accidental dumping		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Air monitoring conducted per HSP/FSI for hazardous atmospheres		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EQUIPMENT PLACEMENT (5.2.2)					
28. Equipment position on firm/level surface, outriggers used		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Location of underground utilities identified		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Safe clearance distance maintained while working under overhead power lines		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Safe distance is maintained while traveling under power lines		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Warning system used to remind operator of excavation edge		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Unattended equipment visibly marked at night		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Tools lowered/parking brake set when not in use, wheels chocked when parked on incline		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EQUIPMENT OPERATION (5.2.3)					
35. Equipment operated on safe roadways and grades		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Equipment operated at safe speed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Operators maintain unobstructed view of travel path		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Equipment not operated during inclement weather, lightning storms		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Equipment started and moved safely		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Operators keep body parts inside cab during operation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Vehicle occupants in safe position while loading/unloading		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Signal person visible to operator when required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Equipment used for hoisting done according to equipment manufacturer specifications		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Lifting and hauling capacities are not exceeded		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EQUIPMENT MAINTENANCE (5.2.4)					
45. Defective components repaired immediately		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Suspended equipment or attachments supported prior to work under or between		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Lockout/tagout procedures used prior to maintenance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Tires on split rims removed using safety tire rack or cage		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Good housekeeping maintained on and around equipment		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[illegible]

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Attachment 2: HS&E Self-Assessment Checklist—Excavations

This checklist shall be used by CH2M HILL personnel only and shall be completed at the frequency specified in the project's Health and Safety Plan/Field Safety Instruction (HSP/FSI).

This checklist is to be used at locations where: 1) CH2M HILL employees enter excavations (complete Sections 1 and 3), and/or 2) CH2M HILL oversight of an excavation subcontractor is required (complete entire checklist).

The SSC may consult with excavation subcontractors when completing this checklist, but shall not direct the means and methods of excavation operations nor direct the details of corrective actions. Excavation subcontractors shall determine how to correct deficiencies and we must rely on their expertise. Conditions considered imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazardous area until the situation is corrected.

Project Name: _____ Project No.: _____

Location: _____ PM: _____

Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

- ☐ Evaluate CH2M HILL employee exposures to excavation hazards
☐ Evaluate a CH2M HILL subcontractor's compliance with excavation HS&E requirements
Subcontractor Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the excavation subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

SECTION 1

Yes No N/A N/O

EXCAVATION ENTRY REQUIREMENTS (4.1)

1. Personnel have completed excavation safety training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Competent person has completed daily inspection and has authorized entry	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Personnel are aware of entry requirements established by competent person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Protective systems are free from damage and in stable condition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Surface objects/structures secured from falling into excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Potential hazardous atmospheres have been tested and found to be at safe levels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Precautions have been taken to prevent cave-in from water accumulation in the excavation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Personnel wearing appropriate, PPE per HSP/SI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
GENERAL (4.2.1)					
9. Daily safety briefing/meeting conducted with personnel		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Excavation and protective systems adequately inspected by competent person		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Defective protective systems or other unsafe conditions corrected before entry		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Guardrails provided on walkways over excavation 6 ft (1.8m) or deeper		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Barriers provided at excavations 6 ft or deeper when excavation not readily visible		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Barriers or covers provided for wells, pits, shafts, or similar excavation 6 ft (1.8 m) or deeper		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Earthmoving equipment operated safely (use earthmoving equipment checklist in HSE-306)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PRIOR TO EXCAVATING (4.2.2)					
16. Dig Permit obtained where required by client/facility		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Location of underground utilities and installations identified		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATING ACTIVITIES (4.2.3)					
26. Rocks, trees, and other unstable surface objects removed or supported		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Exposed underground utility lines supported		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Undermined surface structures supported or determined to be in safe condition		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Warning system used to remind equipment operators of excavation edge		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATION ENTRY (4.2.4)					
32. Trenches > 4 ft (1.2 m) deep provided with safe means of egress within 25 ft (7.6 m)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Structure ramps designed and approved by competent person		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Potential hazardous atmospheres tested prior to entry		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Rescue equipment provided where potential for hazardous atmosphere exists		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Ventilation used to control hazardous atmosphere and air tested frequently		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Appropriate respiratory protection used when ventilation does not control hazards		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Precautions taken to prevent cave-in resulting from water accumulation in excavation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Precautions taken to prevent surface water from entering excavation		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Protection provided from falling/rolling material originating from excavation face		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Spoil piles, equipment, materials restrained or kept at least 2 ft (61 cm) from excavation edge		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EXCAVATION PROTECTIVE SYSTEMS (4.2.5)					
42. Protective systems used for excavations 5 ft (1.5 m) or deeper, unless in stable rock		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43. Protective systems for excavation deeper than 20 ft (6.1 m) designed by registered PE		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. If soil unclassified, maximum allowable slope is 34 degrees		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Protective systems free from damage		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Protective system used according to manufacturer's recommendations and not subjected to loads exceeding design limits		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Protective system components securely connected to prevent movement or failure		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Cave-in protection provided while entering/exiting shielding systems		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Personnel removed from shielding systems when installed, removed, or if vertical movement		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
PROTECTIVE SYSTEM REMOVAL AND BACKFILLING (4.2.6)					
50. Protective system removal starts and progresses from excavation bottom		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Protective systems removed slowly and cautiously		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Temporary structure supports used if failure of remaining components observed		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. Backfilling takes place immediately after protective system removal		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Complete this section for all items checked “No” in Sections 1 or 2. Deficient items must be corrected in a timely manner.

Auditor: _____ Project Manager: _____

This checklist shall be used by CH2M HILL personnel **only** and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: (1) CH2M HILL employees are exposed to hand and power tool hazards and/or (2) CH2M HILL provides oversight of subcontractor personnel who are exposed to hand and power tool hazards.

SC may consult with subcontractors when completing this checklist, but shall not direct the means and methods of hand and power tool use nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies and we must carefully rely on their expertise. Items considered to be imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazard until corrected.

Project Name: _____ Project No.: _____
Location: _____ PM: _____
Auditor: _____ Title: _____ Date: _____

This specific checklist has been completed to:

- ☐ Evaluate CH2M HILL employee exposure to hand and power tool hazards.
☐ Evaluate a CH2M HILL subcontractor's compliance with hand and power tool requirements.
Subcontractors Name: _____

- Check "Yes" if an assessment item is complete/correct.
- Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor. Section 3 must be completed for all items checked "No."
- Check "N/A" if an item is not applicable.
- Check "N/O" if an item is applicable but was not observed during the assessment.

Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-210.

SECTION 1**Yes No N/A N/O****SAFE WORK PRACTICES (5.1)**

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. All tools operated according to manufacturer's instructions and design limitations. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. All hand and power tools maintained in a safe condition and inspected and tested before use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Defective tools are tagged and removed from service until repaired. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. PPE is selected and used according to tool-specific hazards anticipated. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Power tools are not carried or lowered by their cord or hose. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Tools are disconnected from energy sources when not in use, servicing, cleaning, etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Safety guards remain installed or are promptly replaced after repair. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Tools are stored properly. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Cordless tools and recharging units both conform to electrical standards and specifications. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. Tools used in explosive environments are rated for such use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. Knife or blade hand tools are used with the proper precautions. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. Consider controls to avoid muscular skeletal, repetitive motion, and cumulative trauma stressors. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

SECTION 2
Yes No N/A N/O
GENERAL (5.2.2)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 13. PPE is selected and used according to tool-specific hazards anticipated. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. Tools are tested daily to assure safety devices are operating properly. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 15. Damaged tools are removed from service until repaired. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 16. Power operated tools designed to accommodate guards have guards installed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 17. Rotating or moving parts on tools are properly guarded. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 18. Machines designed for fixed locations are secured or anchored. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 19. Floor and bench-mounted grinders are provided with properly positioned work rests. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 20. Guards are provided at point of operation, nip points, rotating parts, etc. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 21. Fluid used in hydraulic-powered tools is approved fire-resistant fluid. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ELECTRIC-POWERED TOOLS (5.2.3)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 22. Electric tools are approved double insulated or grounded and used according to SOP HSE-206. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 23. Electric cords are not used for hoisting or lowering tools. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 24. Electric tools are used in damp/ wet locations are approved for such locations or GFCI installed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 25. Hand-held tools are equipped with appropriate on/off controls appropriate for the tool. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 26. Portable, power-driven circular saws are equipped with proper guards. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

ABRASIVE WHEEL TOOLS (5.2.4)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 27. All employees using abrasive wheel tools are wearing eye protection. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 28. All grinding machines are supplied with sufficient power to maintain spindle speed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 29. Abrasive wheels are closely inspected and ring-tested before use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 30. Grinding wheels are properly installed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 31. Cup-type wheels for external grinding are protected by the proper guard or flanges. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 32. Portable abrasive wheels used for internal grinding are protected by safety flanges. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 33. Safety flanges are used only with wheels designed to fit the flanges. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 34. Safety guards on abrasive wheel tools are mounted properly and of sufficient strength. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

PNEUMATIC-POWERED TOOLS (5.2.5)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 35. Tools are secured to hoses or whip by positive means to prevent disconnection. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 36. Safety clips or retainers are installed to prevent attachments being expelled. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 37. Safety devices are installed on automatic fastener feed tools as required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 38. Compressed air is not used for cleaning unless reduced to < 30 psi, with PPE, and guarded. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 39. Manufacturer's safe operating pressure for hoses, pipes, valves, etc. are not exceeded. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 40. Hoses are not used for hoisting or lowering tools. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 41. All hoses >1/2-inch diameter have safety device at source to reduce pressure upon hose failure. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 42. Airless spray guns have required safety devices installed. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 43. Blast cleaning nozzles are equipped with operating valves, which are held open manually. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 44. Supports are provided for mounting nozzles when not in use. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 45. Air receiver drains, handholes, and manholes are easily accessible. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 46. Air receivers are equipped with drainpipes and valves for removal of accumulated oil and water. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 47. Air receivers are completely drained at required intervals. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 48. Air receivers are equipped with indicating pressure gauges. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 49. Safety, indicating, and controlling devices are installed as required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 50. Safety valves are tested frequently and at regular intervals to assure good operating condition. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

HSE Self-Assessment Checklist—HAND AND POWER TOOLS

Page 3 of 4

SECTION 2 (continued)**Yes No N/A N/O****LIQUID FUEL-POWERED TOOLS (5.2.6)**

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 51. Liquid fuel-powered tools are stopped when refueling, servicing, or maintaining. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 52. Liquid fuels are stored, handled, and transported in accordance with SOP HSE-403 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 53. Liquid fuel-powered tools are used in confined spaces in accordance with SOP HSE-203. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 54. Safe operating pressures of hoses, valves, pipes, filters, and other fittings are not exceeded. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

POWDER-ACTUATED TOOLS (5.2.7)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 55. Only trained employee operates powder-actuated tools. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 56. Powder-actuated tools are not loaded until just prior to intended firing time. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 57. Tools are not pointed at any employee at any time. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 58. Hands are kept clear of open barrel end. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 59. Loaded tools are not left unattended. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 60. Fasteners are not driven into very hard or brittle materials. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 61. Fasteners are not driven into easily penetrated materials unless suitable backing is provided. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 62. Fasteners are not driven into spalled areas. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 63. Powder-actuated tools are not used in an explosive or flammable atmosphere. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 64. All tools are used with correct shields, guards, or attachments recommended by manufacturer. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

JACKING TOOLS (5.2.8)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 65. Rated capacities are legibly marked on jacks and not exceeded. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 66. Jacks have a positive stop to prevent over-travel. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 67. The base of jacks are blocked or cribbed to provide a firm foundation, when required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 68. Wood blocks are place between the cap and load to prevent slippage, when required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 69. After load is raised, it is cribbed, blocked, or otherwise secured immediately. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 70. Antifreeze is used when hydraulic jacks are exposed to freezing temperatures. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 71. All jacks are properly lubricated. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 72. Jacks are inspected as required. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 73. Repair or replacement parts are examined for possible defects. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 74. Jacks not working properly are removed from service and repaired or replaced. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

HAND TOOLS (5.2.9)

- | | | | | |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| 75. Wrenches are not used when jaws are sprung to the point of slippage. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 76. Impact tools are kept free of mushroomed heads. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 77. Wooden handles of tools are kept free of splinters or cracks and are tightly fitted in tool. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

CHAIN SAWS (5.2.10)

- | | | | | |
|---|--------------------------|--------------------------|--------------------------|--------------------------|
| 78. Chainsaw equipped with spark arrestor and fully functioning chain brake | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 79. Chainsaw operator's manual readily available | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 80. Fully stocked first aid kit and multipurpose fire extinguisher available | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 81. Appropriate personal protective equipment available and worn | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 82. Clothing free of loose edges that could become entangled in the saw | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 83. Chainsaw handles kept dry, clean, and free of oil or fuel mixture | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 84. Chainsaws held firmly with both hands and used right-handed | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 85. Operator standing to the left of the saw out of the plane of the chain | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 86. Saw used between the waist and mid-chest level | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 87. Full throttle maintained while cutting | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 88. Operator aware of position of guide bar tip, does not contact tip with anything being cut | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 89. Bumper spikes maintained as close to the object as possible | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 90. Operator aware of what is in the saw's downward path after the cut | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 91. No attempt to made to cut material that is larger than the guide bar of the saw | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 92. Cuts avoided that will cause chain to jam | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 93. Non-metallic wedges used to prevent compression cuts from jamming the blade | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 94. Bystanders and helpers kept at a safe distance from operation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 95. Chainsaw not operated when fatigued | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 96. Fire extinguisher present when operating the chainsaw in forest or brushy areas | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

[illegible]

Auditor: _____ Project Manager: _____

CH2MHILL

HSE Self-Assessment Checklist—Lifting

This checklist shall be used **only** by CH2M HILL personnel and shall be completed at the frequency specified in the project's HSP/FSI.

This checklist is to be used at locations where: (1) CH2M HILL employees perform manual lifting activities (office or projects), and/or (2) CH2M HILL provides oversight of a subcontractor performing manual lifting activities. SC or Office Safety Coordinators/Committee members may consult with subcontractors (if applicable) when completing this checklist but shall not direct the means and methods of activities nor direct the details of corrective actions. Subcontractors shall determine how to correct deficiencies, and we must carefully rely on their expertise. Conditions considered imminently dangerous (possibility of serious injury or death) shall be corrected immediately or all exposed personnel shall be removed from the hazardous area until corrected. Complete the appropriate project or office information:

Project Information					
Project Name: _____		Project No.: _____			
Location: _____		PM: _____			
Auditor: _____		Title: _____		Date: _____	
Office Information					
Office Location: _____		Date: _____			
Auditor: _____		Title: _____		Date: _____	
<p>This specific checklist has been completed to:</p> <p><input type="checkbox"/> Evaluate CH2M HILL employee manual lifting activities.</p> <p><input type="checkbox"/> Evaluate a CH2M HILL subcontractor's manual lifting activities.</p> <p>Subcontractor Name: _____</p> <ul style="list-style-type: none">• Check "Yes" if an assessment item is complete/correct.• Check "No" if an item is incomplete/deficient. Deficiencies shall be brought to the immediate attention of the subcontractor.• Check "N/A" if an item is not applicable.• Check "N/O" if an item is applicable but was not observed during the assessment. <p>Numbers in parentheses indicate where a description of this assessment item can be found in Standard of Practice HSE-112.</p>					
Planning Activities		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
1.	Efforts have been made to inquire about receiving equipment or supplies in containers weighting less than 50 pounds (23 kilograms).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	Equipment or supplies are being delivered as close as possible to their use point.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	Heavy equipment or supplies are being stored off the ground and no lower than knee height.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	Adequate space has been provided to access and lift equipment or supplies without reaching or twisting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Safe Work Practices (5.1)		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
5.	Tasks or activities have been modified to reduce or minimize manual lifting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6.	All employees performing manual lifting have received training on how to lift safely.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7.	Manual lifting control measures are evaluated during assessments.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8.	Manual lifting incidents are reviewed as part of the HSE Program reviews.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9.	Manual lifting incidents are reviewed as part of the HSE Program reviews.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Office Environments (5.1.1)		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
10.	Employees have received lifting training.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11.	Mechanical devices are readily available to employees handling equipment or supplies weighing more than 40 pounds (18 kilograms).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Field Projects (5.1.2)		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
12.	All manual lifting tasks or activities have been addressed in the written site safety plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13.	Employees have received safe lifting training as required by the written site safety plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mechanical Lifting (5.2)		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
14.	Hand trucks and trolleys are visually inspected before use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15.	Hand trucks and trolleys do not have any broken or damaged parts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16.	Hand truck and trolley paths are free of uneven surfaces, water, oil, or cracks and holes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17.	Loads carried by hand trucks are balanced and sturdy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18.	Hand trucks or dollies are being pushed when on level ground.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19.	When going up or down a slope using a hand truck or trolley, the load is downslope of the person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20.	Employees using hand trucks or dollies are moving slowly and cautiously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21.	Employees using hand trucks or trolleys are able to see over the load.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assisted Lifting (5.3)		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
22.	Personnel are not performing manual lifting beyond their physical capabilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23.	Loads are evenly distributed when being handled by multiple people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Manual Lifting (5.4)		<u>Yes</u>	<u>No</u>	<u>N/A</u>	<u>N/O</u>
24.	Before the lift, the load and path was assessed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25.	Loads being lifted are free of sharp edges, slivers, or wet or greasy spots.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26.	Gloves are used for manual lifts of loads with sharp or splintered edges.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27.	Employees performing manual lifts use the proper lifting techniques.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28.	Special tools fabricated for lifting grates or manhole covers are used.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

CH2M HILL Health and Safety Plan

Attachment 5

Key Target Zero Program Elements

(blank forms for field use)

Activity Hazard Analysis EM 385 format

Pre-Task Safety Plans

Safe Behavior Observation

Incident Report and Investigation

(use electronic form when possible)

[HITS](#)

Lessons Learned Template

Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:		Overall Risk Assessment Code (RAC) (Use highest code)					
	SIGNATURES	Activity #	AHA #				
PWD/OICC/ROICC OFFICE		Risk Assessment Code (RAC) Matrix					
NAME & DATE ACCEPTED BY GDA:							
CONTRACT NUMBER:		Severity	Probability				
TASK ORDER/DELIVERY #:			Frequent	Likely	Occasional	Seldom	Unlikely
PRIME CONTRACTOR:							
SUBCONTRACTOR:							
DATE OF PREPARATORY MEETING:		Catastrophic	E	E	H	H	M
DATE OF INITIAL INSPECTION:		Critical	E	H	H	M	L
CONTRACTOR COMPETENT PERSON:		Marginal	H	M	M	L	L
SITE SAFETY and HEALTH OFFICER		Negligible	M	L	L	L	L
ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)		Review each "Hazard" with identified safety "Controls" and determine (RAC)					
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard". Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
H = HIGH RISK (FEAD DIRECTOR)		"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
M = MODERATE RISK (CM or ET or PAR)							
L = LOW RISK (ET or PAR)		"Probability" is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					
Job Steps	Hazards		Controls			RAC	

Job Steps	Hazards	Controls	RAC

Equipment to be Used	Training Requirements and Competent or Qualified Personnel name(s)	Inspection Requirements	RAC

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements

Instructions for completing Contractor Activity Hazard Analysis

1. **Activity/Work Task** – Insert work/task this AHA is written for that is excavation, scaffold building, foundation preparation.
2. **PWO/OICC/ROICC** – Insert name of Public Works Office, Officer In Charge of Construction Office or Resident Officer in Charge of Construction (PWD/OICC/ROICC)
3. Enter name & date AHA accepted by Government Designated Authority (GDA)
4. Enter contract number
5. Enter Task order or Delivery order number
6. Enter Prime Contractors name
7. Enter Subcontractors name
8. Enter date preparatory meeting was held
9. Enter date initial inspection was performed
10. Enter name of contractor competent person onsite for this activity
11. Enter name of Prime Contractor Site Safety and Health Officer
12. Level of government person responsible for accepting the AHA, progressive signatures as level of risk increases.
13. Overall Risk Assessment code is highest code assigned to any Job step after Hazards are assessed and Controls have been assigned
14. Schedule number is activity number from production daily reports
15. AHA number is the sequential number of all AHA's for this contract.
16. Job steps is the complete sequence of work, not general statements to complete the entire activity
17. Hazards is the known safety risks associated with completing the task
18. Controls is the safety measures in place to reduce the hazard to the lowest level possible
19. Risk Assessment code is where Severity and Probability intersect, place that letter E, H, M, or L in the RAC column
20. List all equipment to be used to complete this activity that is crane, backhoe, vehicle, all heavy equipment
21. List the training requirements required by EM 385, Safety Spec 01356 or OSHA that apply to this task.
List competent person(s) required for specific tasks in EM 385
List qualified person(s) required for specific tasks in EM 385
List CPR/First Aid training and qualification dates
22. List all inspection requirements of EM 385, Governmental Safety Requirements Specifications or OSHA 29 CFR 1926

Project: _____	Location: _____	Date: _____
Supervisor: _____ Job _____		
Activity: _____		
Attendees:	Print Name	Sign Name
List Tasks and verify that applicable AHAs have been reviewed:		
Tools/Equipment Required for Tasks (ladders, scaffolds, fall protection, cranes/rigging, heavy equipment, power tools):		
Potential Health and Safety Hazards, including chemical, physical, safety, biological and environmental (check all that apply):		
<input type="checkbox"/> Chemical burns/contact	<input type="checkbox"/> Trench, excavations, cave-ins	<input type="checkbox"/> Ergonomics
<input type="checkbox"/> Pressurized lines/equipment	<input type="checkbox"/> Overexertion	<input type="checkbox"/> Chemical splash
<input type="checkbox"/> Thermal burns	<input type="checkbox"/> Pinch points	<input type="checkbox"/> Poisonous plants/insects
<input type="checkbox"/> Electrical	<input type="checkbox"/> Cuts/abrasions	<input type="checkbox"/> Eye hazards/flying projectile
<input type="checkbox"/> Weather conditions	<input type="checkbox"/> Spills	<input type="checkbox"/> Inhalation hazard
<input type="checkbox"/> Heights/fall > 6 feet	<input type="checkbox"/> Overhead Electrical hazards	<input type="checkbox"/> Heat/cold stress
<input type="checkbox"/> Noise	<input type="checkbox"/> Elevated loads	<input type="checkbox"/> Water/drowning hazard
<input type="checkbox"/> Explosion/fire	<input type="checkbox"/> Slips, trip and falls	<input type="checkbox"/> Heavy equipment
<input type="checkbox"/> Radiation	<input type="checkbox"/> Manual lifting	<input type="checkbox"/> Aerial lifts/platforms
<input type="checkbox"/> Confined space entry	<input type="checkbox"/> Welding/cutting	<input type="checkbox"/> Demolition
<input type="checkbox"/> Underground Utilities	<input type="checkbox"/> Security	<input type="checkbox"/> Poor communications
Other Potential Hazards (Describe):		

Hazard Control Measures (Check All That Apply):			
PPE <input type="checkbox"/> Thermal/lined <input type="checkbox"/> Eye <input type="checkbox"/> Dermal/hand <input type="checkbox"/> Hearing <input type="checkbox"/> Respiratory <input type="checkbox"/> Reflective vests <input type="checkbox"/> Flotation device <input type="checkbox"/> Hard Hat <input type="checkbox"/> Safety-Toed Boots	Protective Systems <input type="checkbox"/> Sloping <input type="checkbox"/> Shoring <input type="checkbox"/> Trench box <input type="checkbox"/> Barricades <input type="checkbox"/> Competent person <input type="checkbox"/> Locate buried utilities <input type="checkbox"/> Daily inspections <input type="checkbox"/> Entry Permits/notification	Fire Protection <input type="checkbox"/> Fire extinguishers <input type="checkbox"/> Fire watch <input type="checkbox"/> Non-spark tools <input type="checkbox"/> Grounding/bonding <input type="checkbox"/> Intrinsically safe equipment	Electrical <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Grounded <input type="checkbox"/> Panels covered <input type="checkbox"/> GFCI/extension cords <input type="checkbox"/> Power tools/cord inspected <input type="checkbox"/> Overhead line clearance <input type="checkbox"/> Underground utils ID'd
Fall Protection <input type="checkbox"/> Harness/lanyards <input type="checkbox"/> Adequate anchorage <input type="checkbox"/> Guardrail system <input type="checkbox"/> Covered opening <input type="checkbox"/> Fixed barricades <input type="checkbox"/> Warning system	Air Monitoring <input type="checkbox"/> PID/FID <input type="checkbox"/> Detector tubes <input type="checkbox"/> Radiation <input type="checkbox"/> Personnel sampling <input type="checkbox"/> LEL/O2 <input type="checkbox"/> No visible dust <input type="checkbox"/> Other	Proper Equipment <input type="checkbox"/> Aerial lift/ladders/scaffolds <input type="checkbox"/> Forklift/heavy equipment <input type="checkbox"/> Backup alarms <input type="checkbox"/> Hand/power tools <input type="checkbox"/> Crane with current inspection <input type="checkbox"/> Proper rigging <input type="checkbox"/> Operator qualified	Welding & Cutting <input type="checkbox"/> Cylinders secured/capped <input type="checkbox"/> Cylinders separated/upright <input type="checkbox"/> Flash-back arrestors <input type="checkbox"/> No cylinders in confined space entry <input type="checkbox"/> Flame retardant clothing <input type="checkbox"/> Appropriate goggles
Confined Space Entry <input type="checkbox"/> Isolation <input type="checkbox"/> Air monitoring <input type="checkbox"/> Trained personnel <input type="checkbox"/> Permit completed <input type="checkbox"/> Rescue	Medical/ER <input type="checkbox"/> First-aid kit <input type="checkbox"/> Eye wash <input type="checkbox"/> First-aid-CPR trained personnel <input type="checkbox"/> Route to hospital	Heat/Cold Stress <input type="checkbox"/> Work/rest regime <input type="checkbox"/> Rest area <input type="checkbox"/> Liquids available <input type="checkbox"/> Monitoring <input type="checkbox"/> Training	Vehicle/Traffic <input type="checkbox"/> Traffic control <input type="checkbox"/> Barricades <input type="checkbox"/> Flags <input type="checkbox"/> Signs
Permits <input type="checkbox"/> Hot work <input type="checkbox"/> Confined space <input type="checkbox"/> Lockout/tagout <input type="checkbox"/> Excavation <input type="checkbox"/> Demolition <input type="checkbox"/> Energized work	Demolition <input type="checkbox"/> Pre-demolition survey <input type="checkbox"/> Structure condition <input type="checkbox"/> Isolate area/utilities <input type="checkbox"/> Competent person <input type="checkbox"/> Hazmat present	Inspections: <input type="checkbox"/> Ladders/aerial lifts <input type="checkbox"/> Lanyards/harness <input type="checkbox"/> Scaffolds <input type="checkbox"/> Heavy equipment <input type="checkbox"/> Drill rigs/geoprobe rigs <input type="checkbox"/> Cranes and rigging <input type="checkbox"/> Utilities marked	Training: <input type="checkbox"/> Hazwaste (current) <input type="checkbox"/> Construction <input type="checkbox"/> Competent person <input type="checkbox"/> Task-specific <input type="checkbox"/> First-aid/CPR <input type="checkbox"/> Confined Space <input type="checkbox"/> Hazcom
Underground Utilities <input type="checkbox"/> Dig alert called <input type="checkbox"/> 3 rd Party locator <input type="checkbox"/> As-builts reviewed <input type="checkbox"/> Interview site staff <input type="checkbox"/> Client review <input type="checkbox"/> soft locate necessary?	Incident Communications <input type="checkbox"/> Work stops until cleared by TM/CM <input type="checkbox"/> Immediate calls to TM/CM <input type="checkbox"/> Client notification <input type="checkbox"/> 24 hour notification setup <input type="checkbox"/> Clear communications	AHA' s <input type="checkbox"/> reviewed and approved by HSM <input type="checkbox"/> onsite and current <input type="checkbox"/> applicable for this day's work <input type="checkbox"/> Communication and incident processes included?	
Field Notes (including observations from prior day, etc.): <hr/> <hr/> <hr/>			

Name (Print): _____

Signature: _____

Date: _____



Safe Behavior Observation Form			
<input type="checkbox"/> Federal <input type="checkbox"/> Commercial (check one)		<input type="checkbox"/> Construction or <input type="checkbox"/> Consulting (check one)	
<input type="checkbox"/> International			
Project Number (required):		Client/Program:	
Project Name:		Observer:	Date:
Position/Title of worker observed:		Background Information/ comments:	
Task/Observation _____			
Observed: _____			
❖ Identify and reinforce safe work practices/behaviors ❖ Identify and improve on at-risk practices/acts ❖ Identify and improve on practices, conditions, controls, and compliance that eliminate or reduce hazards ❖ Proactive PM support facilitates eliminating/reducing hazards (do you have what you need?) ❖ Positive, corrective, cooperative, collaborative feedback/recommendations			
Actions & Behaviors	Safe	At-Risk	Observations/Comments
Current & accurate Pre-Task Planning/Briefing (Project safety plan, STAC, AHA, PTSP, tailgate briefing, etc., as needed)			Positive Observations/Safe Work Practices:
Properly trained/qualified/experienced			
Tools/equipment available and adequate			
Proper use of tools			Questionable Activity/Unsafe Condition Observed:
Barricades/work zone control			
Housekeeping			
Communication			
Work Approach/Habits			
Attitude			
Focus/attentiveness			Observer's Corrective Actions/Comments:
Pace			
Uncomfortable/unsafe position			
Inconvenient/unsafe location			
Position/Line of fire			
Apparel (hair, loose clothing, jewelry)			
Repetitive motion			Observed Worker's Corrective Actions/Comments:
Other...			

For ES Federal Sector projects please email completed forms to: [CH2M HILL ES FED Safe Behavior Observation](#)
 For ES Commercial Sector projects please email completed forms to: [CH2M HILL ES COM Safe Behavior Observation](#)
 For CNR ES staff please email completed forms to: cnressafe@ch2m.com
 For International ES projects please e-mail completed forms to: ESINTLSafeBehaviorObservation@ch2m.com

HITS Incident Report Hardcopy (Phase 1 – Initial Entry)**Phase 1 – Initial Entry****Type of Incident** (May select more than one)

- | | | |
|--|---|------------------------------------|
| <input type="checkbox"/> Injury/Illness | <input type="checkbox"/> Spill/Release | <input type="checkbox"/> Near Miss |
| <input type="checkbox"/> Property Damage | <input type="checkbox"/> Environment/Permit | <input type="checkbox"/> Other |

General Information Section

Preparer's Name: _____ Preparer's Phone Number: _____

Date of Incident: _____ Time of Incident: _____ AM / PM

What Business Group is accountable for this incident: _____

What Business Group SubGroup is accountable for this incident: _____

What CH2M HILL Company is accountable for this incident: _____

Where did the Incident occur?

- ☐ United States, Geographic Region: _____
- ☐ Canada, Province/Territory: _____
- ☐ International, County: _____

Location of Incident?

- ☐ Company Premises, CH2M HILL Office (use 3 letter office code if available): _____
- ☐ Project, Project name: _____
- ☐ In Transit
- Traveling from: _____
- Traveling to: _____
- ☐ At Home
- ☐ Other, Specify: _____

Describe the incident: _____

Describe how this event could have been prevented: _____

Provide Witness Information:

Name: _____	Phone: _____
Name: _____	Phone: _____
Name: _____	Phone: _____

Personnel Notified of Incident (Provide name, date and time):

CH2M HILL Personnel: _____

Client Personnel: _____

Additional Comments:**Injury/Illness Section** [Complete only if Injury/Illness Incident type selected]**Who was injured?**

- ☐ CH2M HILL Employee or CH2M HILL Temp Employee
- ☐ Subcontractor to CH2M HILL (Non-LLC Joint Venture Project)
- ☐ LLC Joint Venture Partner Employee
- ☐ LLC Joint Venture Project Subcontractor/Contractor
- ☐ Other

Name of Injured: _____ Job Title: _____

Employer Name: _____ Supervisor of Employee: _____

Complete for CH2M HILL Employee Injuries

Business Group of Injured Employee: _____

Has the employee called the Injury Management Administrator (1-866-893-2514)?

☐ Yes ☐ No ☐ Not Sure

Has the injured employee's supervisor been notified of this incident?

☐ Yes ☐ No ☐ Not Sure

Complete for Non-CH2M HILL Employee Injuries

Has the project safety coordinator been notified of this incident?

☐ Yes ☐ No ☐ Not Sure

Project Safety Coordinator: _____

Body Part Affected: _____

Injury/Illness (Result): _____

Describe treatment provided (if medication provided, identify whether over-the-counter or prescription): _____

Describe any work restriction prescribed (include dates and number of days): _____

Physician/Health Care Provider Information

Name: _____ Phone: _____

Was treatment provided away from the worksite?

☐ No
☐ Yes

Facility Name: _____

Address: _____

City: _____ Phone Number: _____

Was injured treated in an emergency room?

☐ No ☐ Yes

Was injured hospitalized overnight as an in-patient?

☐ No ☐ Yes

General Information Environmental Section [Complete only if Environment/Permit or Spill/Release Incident type selected]

Who had control of the area during the incident?

- ☐ CH2M HILL, Company: _____
☐ Subcontractor, Company: _____
☐ Joint Venture Partner/Contractor/Subcontractor, Company: _____
☐ Other, Company: _____
Relationship to CH2M HILL: _____

Property Damage Section [Complete only if Property Damage Incident type selected]

Property Damaged: _____

Property Owner: _____

Damage Description: _____

Estimated US Dollar Amount: _____

Spill or Release Section [Complete only if Spill/Release Incident type selected]

Substance: _____

Estimated Quantity: _____

Did the spill/release move off the property?: _____

Spill/Release From: _____

Spill/Release To: _____

Environment/Permit Section [Complete only if Environment/Permit Incident type selected]

Describe Environmental or Permit Issue: _____

Permit Type: _____

Permitted Level or Criteria (for example, discharge limit): _____

Permit Name and Number (for example, NPDES No. ST1234): _____

Substance and Estimated Quantity: _____

Duration of Permit Exceedance: _____

Health, Safety and Environment

Lessons Learned

[Date] EN-LL-15-xx

Lesson Title

Subject

{response}

Situation

{response}

Lessons Learned

{response}

Recommendation/ Comment

{response}

Submitted by:

Date submitted:

Send completed Lessons Learned to the project HSM or EM, as appropriate, and to Sandy Wise/DEN for review, posting and distribution.

Lessons Learned forms are for internal CH2M HILL use to improve HSE performance. Reference to specific individuals and entities have been removed and must not be disclosed during discussion. Any such disclosure may be a breach of privacy and may be referred to human resources for possible disciplinary measures.

Target Zero. It's Personal

ch2m.

CH2M HILL Health and Safety Plan

Attachment 6

Fact Sheets

Tick Fact Sheet

Vehicle Accident Guidance

Working Alone

Tick-Borne Pathogens—A Fact Sheet

Most of us have heard of Lyme disease or Rocky Mountain Spotted Fever (RMSF), but there are actually six known tick-borne pathogens that present a significant field hazard. In some areas, these account for more than half of our serious field incidents. The following procedures should be applied during any field activity—even in places that are predominantly paved with bordering vegetation.

Hazard Recognition

An important step in controlling tick-related hazards is understanding how to identify ticks, their habitats, their geographical locations, and signs and symptoms of tick-borne illnesses.

Tick Identification

The following are the five varieties of hard-bodied ticks that have been associated with tick-borne pathogens:

- Deer (Black Legged) Tick (eastern and pacific varieties)
- Lone Star Tick
- Dog Tick
- Rocky Mountain Wood Tick

The varieties and their geographical locations are illustrated on the following page.

Tick Habitat

In eastern states, ticks are associated with deciduous forest and habitat containing leaf litter. Leaf litter provides a moist cover from wind, snow, and other elements. In the north-central states, is generally found in heavily wooded areas often surrounded by broad tracts of land cleared for agriculture.

On the Pacific Coast, the bacteria are transmitted to humans by the western black-legged (deer) tick and habitats are more diverse. In this region, ticks have been found in habitats with forest, north coastal scrub, high brush, and open grasslands. Coastal tick populations thrive in areas of high rainfall, but ticks are also found at inland locations.

Illnesses and Signs and Symptoms

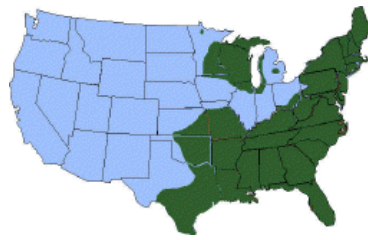
There are six known tick-borne pathogens that cause human illness in the United States. The pathogens may be transmitted during a tick bite—normally hours after attachment. The following are the illnesses, presented in approximate order of most common to least:

- Lyme (bacteria)
- RMSF (bacteria)
- Ehrlichiosis (bacteria)
- STARI (Southern Tick-Associated Rash Illness) (bacteria)
- Tularemia (Rabbit Fever) (bacteria)
- Babesia (protozoan parasite)

Symptoms will vary based on the illness, and may develop in infected individuals typically between 3 and 30 days after transmission. Some infected individuals will not become ill or may develop only mild symptoms. These illnesses present with some or all of the following signs & symptoms: fever, headache, muscle aches, stiff neck, joint aches, nausea, vomiting, abdominal pain, diarrhea, malaise, weakness, small solid, ring-like, or spotted rashes. The bite site may be red, swollen, or develop ulceration or lesions. For Lyme disease, the bite area will sometimes resemble a target pattern. A variety of long-term symptoms may result if the illness is left untreated, including debilitating effects and death.



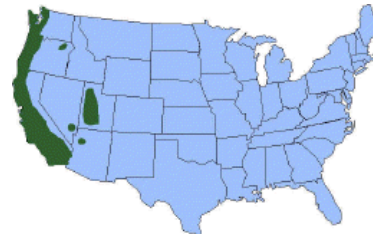
Deer Tick



Distribution of Deer Tick (dark green)



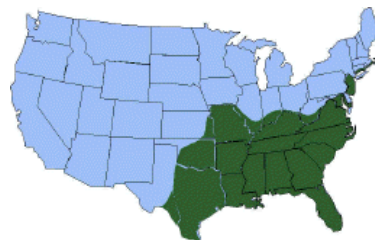
From Left: adult female, adult male, nymph, and larvae Deer Tick (centimeter scale)



Distribution of Pacific Deer Tick (dark green)



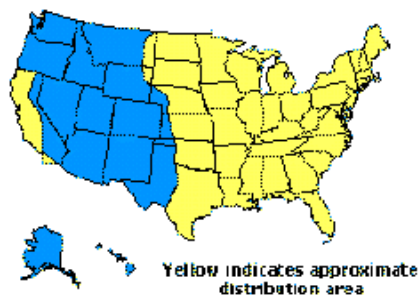
Lone Star Tick



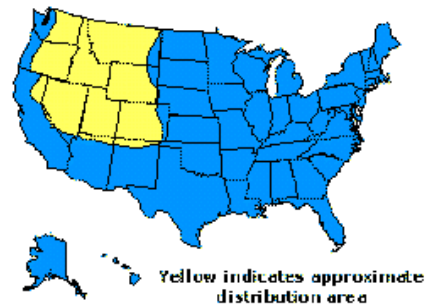
Distribution of Lone Star Tick (Green)



Dog Tick



Rocky Mountain Wood Tick



Hazard Control

The methods for controlling exposure to ticks include, in order of most- to least-preferred:

- Avoiding tick habitats and ceasing operations in heavily infested areas
- Reducing tick abundance through habitat disruption or application of acaricide
- Personal protection through use of repellants and protective clothing
- Frequent tick inspections and proper hygiene

Vaccinations are not available and preventative antibiotic treatment after a bite is generally not recommended.

Avoidance and Reduction of Ticks

To the extent practical, tick habitats should be avoided. In areas with significant tick infestation, consider stopping work and withdrawing from area until adequate tick population control can be achieved. Stopping and withdrawing should be considered as seriously as entering an area without proper energy control or with elevated airborne contaminants—tick-borne pathogens present risk of serious illness!

In areas where significant population density or infestation exists, tick reduction should be considered. Tick reduction can be achieved by disrupting tick habitats and/or direct population reduction through the use of tick-toxic pesticides (Damminix, Dursban, Sevin, etc.).

Habitat disruption may include only simple vegetative maintenance such as removing leaf litter and trimming grass and brush. Tick populations can be reduced by between 72 and 100 percent when leaf litter alone is removed. In more heavily infested areas, habitat disruption may include grubbing, tree trimming or removal, and pesticide application (Damminix, Dursban, Sevin, etc.). This approach is practical in smaller, localized areas or perimeter areas that require occasional access. Habitat controls are to be implemented with appropriate health and safety controls, in compliance with applicable environmental requirements, and may be best left to the property owner or tenant or to a licensed pesticide vendor. Caution should be exercised when using chemical repellents or pesticides in or around areas where environmental or industrial media samples will be collected for analysis.

Personal Protection

After other prevention and controls are implemented, personal protection is still necessary to control exposure to ticks. Personal protection must include all of the following steps:

- So that ticks may be easily seen, wear light-colored clothing. Full-body new Tyvek (paper-like disposable coveralls) may also be used
- To prevent ticks from getting underneath clothing tuck pant legs into socks or tape to boots
- Wear long-sleeved shirts, a hat, and high boots
- Apply DEET repellent to exposed skin or clothing per product label
- Apply permethrin repellent to the outside of boots and clothing before wearing, per product label
- Frequently check for ticks and remove from clothing
- At the end of the day, search your entire body for ticks (particularly groin, armpits, neck, and head) and shower
- To prevent pathogen transmission through mucous membranes or broken/cut skin, wash or disinfect hands, and/or wear surgical-style nitrile gloves any time ticks are handled

Pregnant individuals and individuals using prescription medications should consult with their physician and/or pharmacists before using chemical repellents. Because human health effects may not be fully

known, use of chemical repellents should be kept to a minimum frequency and quantity. Always follow manufacturers' use instructions and precautions. Wash hands after handling, applying, or removing protective gear and clothing. Avoid situations such as hand-to-face contact, eating, drinking, and smoking when applying or using repellents.

Remove and wash clothes per repellent product label. Chemical repellents should not be used on infants and children.

Vaccinations are generally not available for tick-borne pathogens. Although production of the LYMErix™ Lyme disease vaccination has been ceased, vaccination may still be considered under specific circumstances and with concurrence from the consulting physician.

Tick Check

A tick check should be performed after field survey before entering the field vehicle (you do not want to infest your field vehicle with ticks). Have your field partner check your back; the backs of your legs, arms, and neck; and your hairline. Shake off clothing as thorough as possible before entering the vehicle. Once the field day is complete, repeat this procedure and perform a thorough self check.

If a tick has embedded itself into the skin, remove the tick as described below.

Tick Removal

1. Use the tick removal kit obtained through the CH2M HILL Milwaukee warehouse, or a fine-tipped tweezers or shield your fingers with a tissue, paper towel, or nitrile gloves.
2. Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. If this happens, remove mouthparts with tweezers. Consult your healthcare provider if infection occurs.



3. Avoid squeezing, crushing, or puncturing the body of the tick because its fluids (saliva, hemolymph, gut contents) may contain infectious organisms. Releasing these organisms to the outside of the tick's body or into the bite area may increase the chance of infectious organism transmission.
4. Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin. This precaution is particularly directed to individuals who remove ticks from domestic animals with unprotected fingers. Children, elderly persons, and immunocompromised persons may be at greater risk of infection and should avoid this procedure.
5. After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
6. Should you wish to save the tick for identification, place it in a plastic bag, with the date of the tick bite, and place in your freezer. It may be used at a later date to assist a physician with making an accurate diagnosis (if you become ill).

Note: Folklore remedies such as petroleum jelly or hot matches do little to encourage a tick to detach from skin. In fact, they may make matters worse by irritating the tick and stimulating it to release additional saliva, increasing the chances of transmitting the pathogen. These methods of tick removal should be avoided. In addition, a number of tick removal devices have been marketed, but none are better than a plain set of fine tipped tweezers.

First-aid and Medical Treatment

Tick bites should always be treated with first-aid. Clean and wash hands and disinfect the bite site after removing embedded tick. Individuals previously infected with Lyme disease does not confer immunity—re-infection from future tick bites can occur even after a person has contracted a tick-borne disease.

The employee should contact the Injury Management/Return To Work provider (IMRTW), WorkCare using the toll-free number 866-893-2514 to report the tick bite. WorkCare will follow-up with each CH2M Hill employee who reports a tick bite and is at risk of developing Lyme disease by monitoring for symptoms up to 45 days, and will refer the employee to a medical provider for evaluation and treatment as necessary.

2015 Vehicle Accident Guidance—E&N Business Group

Remember that if you are **renting** a non-CH2M HILL owned vehicle (short-term rental) in the U.S., you should carry the [insurance card](#) from the state where your driver's license is issued.

If you operate a **fleet vehicle**, carry the [insurance card](#) where the vehicle is registered.

For ALL Vehicles if you are in an accident:

1. If you are injured, call 911 for emergency medical treatment or 1-866-893-2514 to contact the CH2M HILL Occupational Nurse/Physician for minor injuries. If you feel you have not been injured, contact the RHSM for guidance on whether calling the CH2M HILL Occupational Nurse/Physician is applicable.
2. **Call the Police**--For any vehicle accident/damage, it is recommended that the local police (or site security/emergency services if working on a client site that provides such services) be called to determine if a report needs to be filed. In some instances, a report may not be required (during accident alerts, or in public parking lots). Document that the authorities were called and follow up with any guidance they give you. State requirements vary. If a report is filed, obtain a copy.
3. Notify Supervisor, (and PM/RHSM if working on a project site)
4. Complete a HITS report on the VO.

Additional Steps

To report an auto accident, and before a claim can be taken by telephonic reporting, have available your name (the company name alone is no longer accepted, a driver's name must be provided even for fender benders), location of accident and your office address if different than the accident location, business group and project number. A claim cannot be taken without your name, address, business group and your project number. By location the state where the accident occurred, and which office you are aligned to, i.e., accident occurs in Idaho, but you are out of the Denver office. Advise the claim recorder the accident occurred in ID, but that your office location is Denver. This will assist the claim intake person in identifying location coding for the claims.

Auto accidents involve two different sections of an Auto policy:

- 1) Liability to others due to Bodily Injury and Property Damage
- 2) Physical Damage - Comprehensive and Collision - damage to the vehicle CH employee is driving

CH2M Hill has Liability coverage for any auto - our policy will respond on either a primary or excess basis.

Refer to the table below for additional notifications to make based on the type of accident experienced and vehicle being used.

Liability - Bodily Injury or Property Damage to Others

Scenario	Which Coverage Responds	What to do if in an accident
CH2M Hill fleet, pool or project vehicle - long term lease - lower 48	CH2M Hill - Primary	Contact Broadspire (1-800-753-6737); Mary Ellegood-Oberts/DEN (720-286-2291); Linda George/DEN (720-286-2057)
CH2M Hill fleet, pool or project vehicle - long term lease - Alaska (North Slope)	CH2M Hill - Primary	Mary Ellegood-Oberts/DEN (720-286-2291)
Client vehicle driven by CH2M Hill employee	Client's auto policy unless client has made CH2M Hill responsible for vehicle	Contact Broadspire (1-800-753-6737); Mary Ellegood-Oberts/DEN (720-286-2291); contact client

Liability - Bodily Injury or Property Damage to Others

Short term lease (30 days or less)	Rental car company if rented through Enterprise, Budget or Hertz; CH2M Hill excess	Contact Broadspire (1-800-753-6737); Contact local branch of rental car company where vehicle leased (ERAC includes 24 hour roadside assistance) and Mary Ellegood-Oberts/DEN (720-286-2291)
Short term lease (30 days or less)	CH2M Hill - Primary if rented through company other than our national agreements; \$100,000 deductible	Contact Broadspire (1-800-753-6737); Contact rental car company and Mary Ellegood-Oberts/DEN (720-286-2291)
Personal vehicle used on business	Employee's personal auto policy; CH2M Hill on an excess basis	Contact personal auto insurance company; contact Mary Ellegood-Oberts/DEN (720-286-2291)

Physical Damage - damage to vehicle CH employee was driving

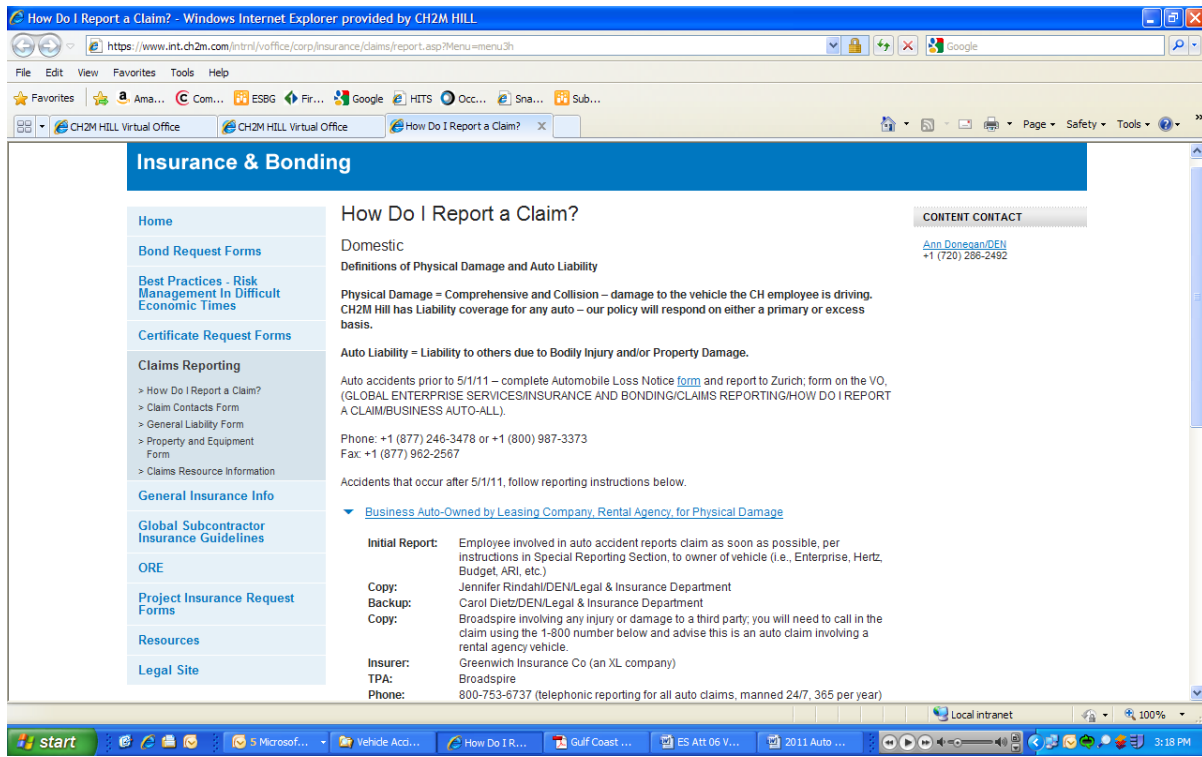
Scenario	Which Coverage Responds	What to do if in an accident
CH2M HILL fleet, pool or project vehicle - long term lease - lower 48	CH2M Hill ONLY if vehicle is scheduled on policy - \$5,000 deductible	Contact Broadspire (1-800-753-6737); Mary Ellegood-Oberts/DEN (720-286-2291); Linda George/DEN (720-286-2057)
CH2M Hill fleet, pool or project vehicle - long term lease - Alaska (North Slope)	CH2M Hill Equipment Schedule if scheduled on policy	Contact Mary Ellegood-Oberts/DEN (720-286-2291)
CH2M Hill fleet, pool or project vehicle - long term lease	ARI if physical damage coverage purchased - \$500 deductible	Contact Mary Ellegood-Oberts/DEN (720-286-2291); call ARI at 1-800-221-1645 give them Client Code and ARI fleet vehicle number; and notify Linda George/DEN - Fleet Coordinator - 720-286-2057
Client vehicle CH2M Hill Employee is driving	Client's auto policy unless client has made CH2M Hill contractually responsible for vehicle	Contact Mary Ellegood-Oberts/DEN (720-286-2291); contact client; contact Broadspire (1-800-753-6737)
Short term lease (30 days or less) using corporate VISA	VISA if corporate credit card used and vehicle is not a pickup, truck, cargo van or used off-road	Contact VISA - 1-800-847-2911 or http://www.visa.com/eclaim
Short term lease (30 days or less) through Enterprise (ERAC) and vehicle is used off-road and physical damage coverage included when vehicle leased	ERAC up to \$3,000 in damage; CH2M Hill's coverage is excess	Notify Rental Car Company; contact Mary Ellegood-Oberts/DEN (720-286-2291) if damage over \$5,000
Short term lease (30 days or less) did not use corporate VISA	CH2M Hill - \$5,000 deductible (project responsibility)	Contact Broadspire (1-800-753-6737); Contact Mary Ellegood-Oberts/DEN (720-286-2291); contact VISA - 1-800-847-2911 or http://www.visa.com/eclaim
Personal vehicle used on business	CH will reimburse the amount of the deductible carried on the employee's policy up to \$500 whichever is less	Contact Mary Ellegood-Oberts/DEN (720-286-2291); contact client; contact Broadspire (1-800-753-6737)

Details for reporting a claim on the CH2M Hill VO are accessed by going to the VO home page and clicking:

GLOBAL ENTERPRISE SERVICES/INSURANCE & BONDING/CLAIMS REPORTING

HOW DO I REPORT A CLAIM TAB or access the following URL:

<https://www.int.ch2m.com/intrnl/voffice/corp/insurance/claims/report.asp?Menu=menu3h>



For Personally Owned Vehicles (POVs):

CH2M HILL does not provide auto insurance for POVs, it is responsibility of the owner. If you are in a vehicle accident conducting company business, contact the police as above, supervisor, and 911 or CH2M HILL's occupational nurse/physician as stated above. Complete a HITS report. Contact Mary Ellegood-Oberts/DEN for assistance for meeting personal insurance deductibles (up to \$500) with proof of insurance and deductible.

If using your POV for extended project use, notify the PM to make sure a rental car is not needed. Check your insurance policy for guidance on using the POV for business use.

Additional Resources:

[Claims Resource Manual](#)

**WORKING ALONE PROTOCOL
CALL-IN CONTACT FORM**

Date of site work: _____ Expected start time: _____

Name of CH2M HILL employee in the field: _____

Name of CH2M HILL employee responsible to receive contact: _____

Client Emergency Contact (if any): _____

CH2M HILL employee's contact numbers:

Radio # _____

Cell Phone # _____

Address and Location of work: _____

Directions/Map: _____

Planned Activity: _____

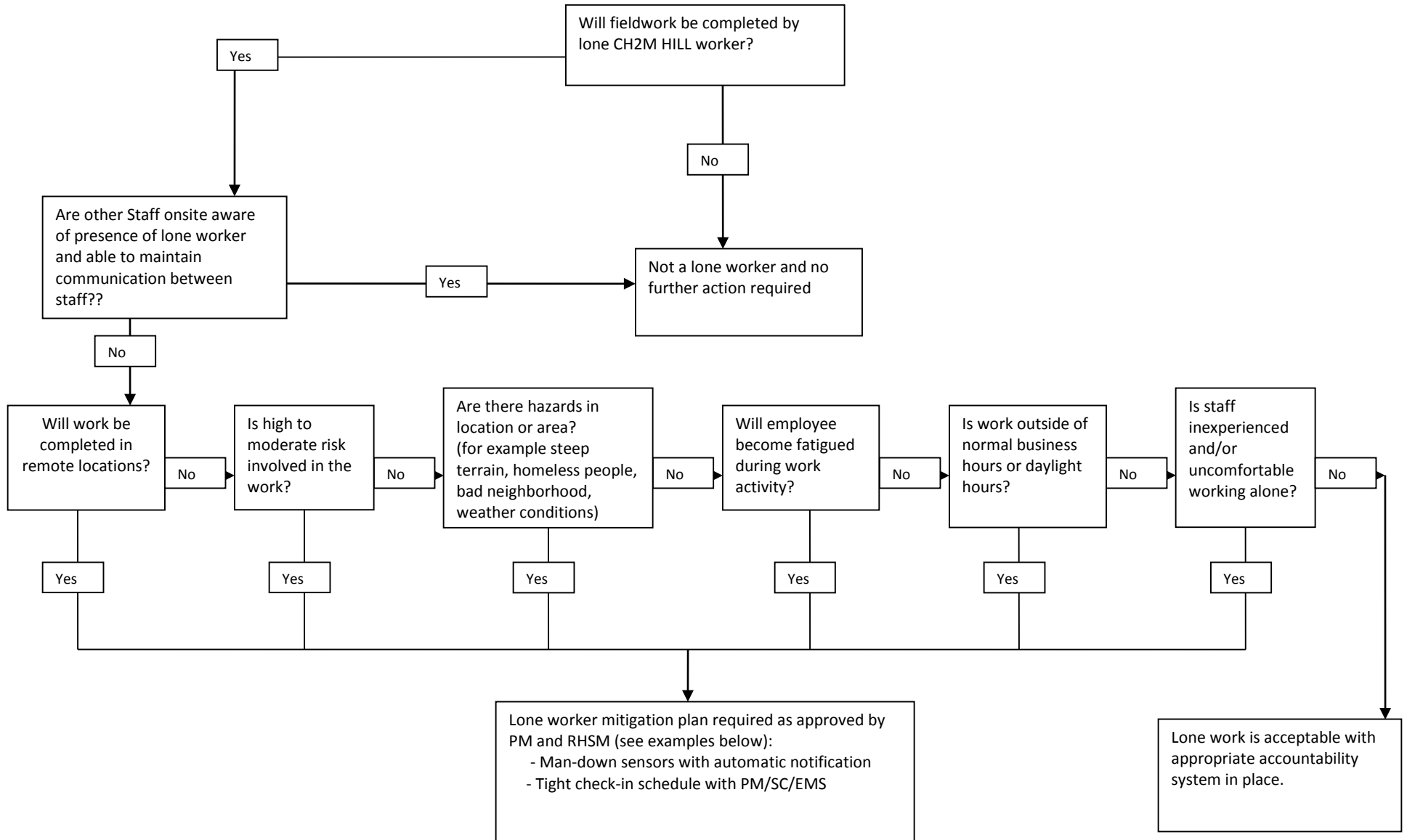
Specified Frequency and time for call in: _____

Time	Verified	Location
------	----------	----------

If lone worker fails to call in at specified frequency/time:

1. Call worker's radio and cell to determine if an emergency exists.
2. If no reply, immediately call client security/emergency service if there is one at the site.
3. If there is no client security, call Emergency Services (911). Inform the dispatcher there is a lone worker that cannot be contacted and there may be an emergency onsite. Provide the lone worker's name, their last known location, and your contact information.
4. After Emergency Services have been contacted, call the other emergency contacts, PM, and Responsible Health and Safety Manager.

Lone Worker Protocol



CH2M HILL Health and Safety plan
Attachment 7

Observed Hazard Form



OBSERVED HAZARD FORM

Name/Company of Observer (*optional*):

Date reported: _____

Time reported: _____

Contractor/s performing unsafe act or creating unsafe condition:

1. _____

2. _____

3. _____

Unsafe Act or Condition:

Location of Unsafe Act or Condition:

Name of CH2M HILL Representative:

Corrective Actions Taken:

Date: _____

Project Safety Committee Evaluation:

Date: _____

CH2M HILL Health and Safety Plan
Attachment 8

Stop Work Order Form



Stop Work Order

REPORT PREPARED BY:

Name:	Title:	Signature:	Date:

ISSUE OF NONPERFORMANCE:

Description:	Date of Nonperformance:

SUBCONTRACTOR SIGNATURE OF NOTIFICATION:

Name:	Title:	Signature:	Date:

** Corrective action is to be taken immediately. Note below the action taken, sign and return to CCI. * Work may not resume until authorization is granted by CH2M HILL Constructors, Inc. Representative,*

SUBCONTRACTOR'S CORRECTIVE ACTION

Description:	Date of Nonperformance:

SUBCONTRACTOR SIGNATURE OF CORRECTION

Name:	Title:	Signature:	Date:

CH2M HILL Health and Safety Plan

Attachment 9

Agency Inspection Target Zero Bulletin

TARGET ZERO BULLETIN

Subject: HSSE Agency Inspections (OSHA, EPA, DOT, State Health Department)

Do you know what YOU would do if an agency inspector arrived at your site unannounced?

Recently, a State Occupational Safety and Health Administration (OSHA) inspector made an unannounced visit to one of our Federal project sites. OSHA, U.S. Environmental Protection Agency (EPA), and authorized state or local agencies have authority to inspect any facility that is subject to health, safety, and environmental legislation. Inspections may be announced or unannounced. This particular inspector indicated that the project was targeted for an inspection because the work was funded by the American Recovery and Reinvestment Act (ARRA).

Enterprise Standard Operating Procedure (SOP) HSE-201, *Agency Inspections and Communications*, describes the responsibilities, procedures, and requirements associated with inspections conducted by external regulatory agencies, as well as the methods for communicating information to key individuals. This Target Zero Bulletin is a brief summary of what to do in the event of an agency inspection at your site. Refer to the SOP for more specific guidance.

Notification of Inspections

- If the inspection is an announced regulatory agency inspection, the Project Manager (PM) should notify the Responsible Health and Safety Manager (RHSM) and Responsible Environmental Manager (REM) well in advance of the inspection.
- If an unannounced agency inspector visits one of our projects, Field personnel must immediately notify the project Emergency Response Coordinator (ERC). Typically the ERC is the Safety Coordinator (SC).
- The **ERC must immediately notify the RHSM/REM**, as appropriate, of unannounced inspections, or designate someone to call the RHSM/REM. The RHSM/REMs can provide guidance to the field staff and PM.

Inspector Credential Verification

- Upon arrival, the ERC must request the inspector to provide official credentials. Record the inspector's name and office phone number or obtain the inspector's business card.
- The inspector shall sign the visitors log and be given a site-specific health, safety, and environmental protection briefing.
- The inspector shall meet any site access requirements associated with security clearances, specialized training, and medical monitoring. The CH2M HILL representative shall verify that the inspector possesses these requirements; access will only be granted to those areas where appropriate access requirements are met. Some inspectors have the authority to gain access to any work area at any time, such as an inspector with a search warrant. In these cases, we can stop work operations as necessary to protect the safety of the inspector(s).

Opening Conference

- The CH2M HILL Project Manager, ERC, RHSM, or REM, and the inspector shall determine attendees for the opening conference. The RHSM (for OSHA and other worker health and safety inspections) or REM (for environmental inspections) shall join the opening conference via conference call.
- The inspector shall inform CH2M HILL of the purpose of the inspection and provide a copy of the complaint, if applicable.
- The inspector shall outline the scope of the inspection, including employee interviews conducted in private, physical inspection of the workplace and records, possible referrals, discrimination complaints, and the closing conference(s).

Requests for OSHA Logs

- An OSHA inspector may request to review the project OSHA Injury/Illness log, better known as the OSHA 300 Log. Contact your RHSM for assistance in obtaining the OSHA 300 Log.
- Field projects with a continuous duration of one year or longer are considered to be separate establishments and are required to maintain an OSHA 300 log specific to the project. The project OSHA 300 log should be maintained onsite and kept current.
- Recordable injuries and illnesses sustained on field projects less than one year in duration are maintained on the CH2M HILL office log where the injured employee is based.

The Inspection

- The scope of the inspection shall be limited to that indicated by the inspector in the opening conference. The inspector shall be escorted to relevant areas only. The ERC or other designated by the RHSM or REM must accompany the inspector during the inspection.
- Ensure that the inspection is limited to the scope that the inspector disclosed during the opening conference. The ERC should always take notes which identify: areas inspected, machinery or equipment and materials examined, employees or other persons interviewed, and photographs taken by the inspector.
- The inspector will observe safety, health, and environmental conditions and practices and document the inspection process. The inspector may also take photos and instrument readings, examine records, collect air samples, measure noise levels, survey existing engineering controls, and monitor employee exposure to toxic vapors, gases, and dusts.
- CH2M HILL should gather duplicate information (photographs, readings, samples) in the same manner and condition as the inspector. If the equipment needed to take duplicate samples is not onsite, ask the inspector if the sampling can wait until the equipment is available. If samples are taken, request a description of the tests that the agency intends to perform on the samples and request results as soon as they are available.
- Employees may be questioned during the inspection tour. The employee can refuse to speak to an inspector, can speak to the inspector with a company representative (including management) present, or can speak to the inspector privately. It is CH2M HILL policy that employees who wish to speak to the inspector are not discriminated against, intimidated, or otherwise mistreated for exercising their rights during compliance inspections.
- Copies of documents should not be provided to the inspector without the approval of the RHSM or REM or Legal Insurance Department (LID). **DO NOT** voluntarily release documents. Respond only to inspection team requests.
- During the course of the inspection, the inspector may point out violations. For each violation, the CH2M HILL representative should ask the inspector to discuss possible corrective action. Where possible, violations detected by the inspector should be corrected immediately and noted by the inspector as corrected.
- For those items which cannot be corrected immediately, an action plan shall be formulated for timely correction. In any instance, employees exposed to hazards shall be removed from the area.

Closing Conference

After the inspection, a closing conference is normally held as follows:

- The CH2M HILL PM, ERC, RHSM or REM shall be involved via conference call in the closing conference, at a minimum;
- The inspector shall describe the apparent violations found during the inspection and other pertinent issues as deemed necessary by the inspector. CH2M HILL shall be advised of their rights to participate in any subsequent conferences, meetings or discussions. Any unusual circumstances noted during the closing conference shall be documented by the ERC;

- The inspector shall discuss violations observed during the inspection and indicate for which violations a citation and a proposed penalty may be issued or recommended;
- The ERC shall request receipts for all samples and approved documents photocopied by the inspector, request a photocopy of the inspector's photograph log, and request a copy of the final inspection report; and
- Any documentation from an agency inspection must be transmitted immediately to the RHSM or REM, and LID.

Unannounced regulatory agency inspections may happen at any time on our projects -

Get your RHSM/REM and PM involved immediately if an Inspector arrives.

CH2M HILL Health and Safety Plan

Attachment 10

Completed CH2M HILL AHAs

Activity Hazard Analysis (AHA)

ACTIVITY/WORK TASK:	Oversight of subcontractors	Overall Risk Assessment Code (RAC) (Use highest code)				L	
Site Indian Head, UXO 20	SIGNATURES	Activity #				AHA #	
PWD/OICC/ROICC OFFICE		Risk Assessment Code (RAC) Matrix					
NAME & DATE ACCEPTED BY GDA:							
CONTRACT NUMBER:		Severity	Probability				
TASK ORDER/DELIVERY #:			Frequent	Likely	Occasional	Seldom	Unlikely
PRIME CONTRACTOR:							
SUBCONTRACTOR:							
DATE OF PREPARATORY MEETING:							
DATE AND NAME OF REVIEWER		Catastrophic	E	E	H	H	M
CONTRACTOR COMPETENT PERSON:		Critical	E	H	H	M	L
SITE SAFETY and HEALTH OFFICER		Marginal	H	M	M	L	L
		Negligible	M	L	L	L	L
ACCEPTANCE BY GOVERNMENT DESIGNATED AUTHORITY (GDA)		Review each “Hazard” with identified safety “Controls” and determine (RAC)					
E = EXTREMELY HIGH (PWO/OICC/ROICC)		Identify the RAC (Probability/Severity) as E, H, M, or L for each “Hazard” .Place the highest RAC at the top of AHA. This is the overall risk assessment code for this activity					
H = HIGH RISK (FEAD DIRECTOR)		“Severity” is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible after controls are in place					
M = MODERATE RISK (CM or ET or PAR)							
L = LOW RISK (ET or PAR)		“Probability” is the likelihood to cause an incident, near miss, or accident did occur and identified as: Frequent, Likely, Occasional, Seldom, or Unlikely after controls are put in place.					
Job Steps	Hazards	Controls				RAC	
Preparation for work	General preparedness Medical emergency Strains/sprains Fire	<ul style="list-style-type: none"> Complete HASP, AHA review Complete PTSP, daily safety meeting. Check for cell phone coverage or have radio or satellite phone. Designate rally point and evacuation point (daily if working in new locations each day). Drive to designated hospital emergency room before first day start of work or during first day of work. Make sure everyone on job site knows directions to ER. Check daily weather report and plan activities around severe weather/poor driving conditions. Review, inspect and locate safety equipment including fire extinguisher, first aid kit, insect repellent, PPE, water, food, rain gear, etc Utilize proper lifting procedure when loading and unloading vehicles and equipment and suitcases when traveling. 				L	

		<ul style="list-style-type: none"> • Keep load weight to under 50 lbs, and use mechanical means when possible to avoid having to carry the full weight. • Bend down at the knees and lift with your legs rather than bending and lifting with your back. Do not lift and twist. • Required safety equipment for each vehicle includes: first aid kit; personal eye-wash; potable water; cell phone; and a fully charged fire extinguisher (rated 2-A:10-B-C). <p>If you are required to utilize a fire extinguisher, use the following technique (PASS):</p> <p><u>P</u>ull cotter pin <u>A</u>im at the base of the fire <u>S</u>queeze the handle <u>S</u>weep the extinguisher hose back and forth.</p>	
	Inclement weather	<ul style="list-style-type: none"> • Sudden inclement weather can rapidly encroach upon field personnel. Preparedness and caution are the best defenses. Carry clothing appropriate for inclement weather. Realize ice and snow can adversely affect driving conditions, and plan accordingly. • Take heed of the weather forecast for the day and pay attention for signs of changing weather that indicate an impending storm. Signs include towering thunderheads, darkening skies, or a sudden increase in wind. If stormy weather ensues, field personnel should discontinue work and seek shelter until the storm has passed. • Avoid working during thunderstorms. • If caught in one, seek shelter. • Avoid lone trees as shelter and open, bare areas. • Do not cross water bodies. • If caught in open area, place feet close together and crouch down as small as possible, without lying on the ground. • Ground strikes are known to be initiated by “leaders”, or charges, from the earth making a connection to the 	L

		<p>charge in the clouds. This may cause your hair to stand up, immediately crouch as described above.</p> <ul style="list-style-type: none"> • Avoid low lying areas such as washes after rain as they can flood. • Take time to review where the closest structure that can be used when severe weather occurs and what route will be used to get there. Listen to weather reports and plan for severe weather. Designate an emergency evacuation assembly area and evacuation routes for non-weather related emergencies (fire, etc.). Keep a copy of the Emergency Contact page from the HSP accessible. • Remember that lightning may strike several miles from the parent cloud, so work will be stopped and restarted accordingly. Seek refuge when thunder sounds or there is visible lightning. Do not resume activity until 30 minutes after the last thunder clap or lightning strike. 	
Drive to closest access point for site.	Auto accidents.	<ul style="list-style-type: none"> • Inspect the vehicle prior to departure. • If driving a rental car, become familiar with the safe operation of vehicles of the type and size to be operated. Large vehicles such as full size vans and pick-ups have different vision challenges and handling characteristics than smaller vehicles. • Drivers shall not use cellular phones, or other two-way communication devices while driving (including hands-free devices). Pull over and park the car to make or take phone calls, text, or e-mail. • Be sure to take adequate rest breaks when driving, especially on long distance trips. • Obey speed limits; be aware of blind spots or other hazards associated with low visibility. Practice defensive driving techniques, such as leaving plenty of room between your vehicle and the one ahead of you. 	L

		<ul style="list-style-type: none"> • Do no drive while drowsy. Drowsiness can occur at any time, but is most likely after 18 hours or more without sleep. • Maintain focus on driving. Eating, drinking, smoking, adjusting controls can divert attention from the road. Take the time to park and perform these tasks when parked rather than while driving. • If vehicle is malfunctioning, don't pull over off the road suddenly. Give the traffic behind you notice that you are pulling off. • Park as far from traffic as possible, use caution when exiting vehicle. • Always wear seatbelt in vehicle, regardless of length of drive. • Use vehicle flashers if moving slower than normal traffic. • Pull off the road, put the car in park and turn on flashers before talking on a mobile phone, even with a hands-free device. • Apply Get Out and Look (GOAL) when returning to the vehicle to prevent property damage and injury by looking for obstructions, personnel or other items. Back slowly and use a spotter when view is obstructed. It is preferable to park in a spot that you can pull forward out of, less preferable to back into a parking spot so you can pull straight out of it, and least preferable to drive into a parking spot that you have to back out of. 	
General oversight	Biological hazards Snakes Ticks Poison Ivy/oak Wasps/Bees	Watch for animal hazards in wooded and high grassy areas (i.e. snakes, rabid raccoons, etc.); follow SSHP for snake hazards. Watch where you put your feet. Snake chaps as necessary. Ticks. <ul style="list-style-type: none"> • Wear light colored long sleeve shirts and pants. Use repellent on exposed skin (with at least 35% DEET) if ticks/other biting insects are suspected in the area. Whenever you use an insecticide or insect repellent, 	L

		<p>be sure to read and follow the manufacturer's directions for us, as printed on the product. Tape bottoms of pant legs or tuck pants into socks. Use permethrin on shirts, pants and socks, as per application instructions prior to donning clothing.</p> <ul style="list-style-type: none"> • Wear protective clothing such as Tyvek or Bug-out suits if ticks are abundant in addition to controls above. • Have tick removal kits accessible. Use the buddy system and perform tick inspections prior to entering the field vehicle. If ticks were not planned to be encountered and are observed, do not continue field work until these controls can be implemented. • See Tick Fact Sheet attached to the HSP for further precautions and controls to implement when ticks are present. Follow Navy CLEAN tick protocol. If bitten by a tick, follow the removal procedures found in the tick fact sheet, call the occupational nurse at 1-866-893-2514. • Try to avoid high grass or the boundary between woods and fields where ticks congregate. • Lint/pet hair rollers (the sticky paper rollers used to remove lint and pet hair) work really well to remove ticks, especially the really small ticks that are hard to see. Clip one to your belt and roll yourself every 15-30 minutes when in areas that are likely to have ticks, or if you have just walked through brush. If you see ticks on the roller, do a careful check for other ticks, and check to make sure you are following the tick prevention guidelines. Consider upgrading your PPE as necessary. • Do a careful tick check at the end of the day. • All tools used in the poison ivy, sumac or oak area, including those used to cut back poison oak, surveying instruments used in the area, air monitoring equipment or other test apparatus must be decontaminated before they are placed back into the site vehicle. If on-site decontamination is not possible, 	
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		<p>use plastic to wrap any tools or equipment until they can be decontaminated.</p> <ul style="list-style-type: none"> • Personal protective equipment, including Tyvek coveralls, gloves, and boot covers must be worn if poison ivy/oak cannot be avoided. PPE must be placed into plastic bags and sealed if they are not disposed immediately into a trash receptacle. • As soon as possible following the work, shower to remove any potential contamination. Any body part with suspected or actual exposure should be washed with Zanfel, Tecnu or other product designed for removing urushiol. If you do not have Zanfel or Tecnu wash with cold water. Do not take a bath, as the oils can form an invisible film on top of the water and contaminate your entire body upon exiting the bath. • Tecnu may also be used to decontaminate equipment. • Use IvyBlock or similar products to prevent poison oak, ivy and sumac contamination. Check with the closest CH2M HILL warehouse to see if these products are available. Follow all directions for application. • If you do come into contact with one of these poisonous plants and a reaction develops, contact your supervisor and the occupational nurse 1-866-893-2514. • Check for bees/wasp/spider nests before reaching into/behind any objects. Always wear leather gloves when reaching into areas. • Report all bites stings to your supervisor or SC. • Inform supervisor if you are allergic to bees. 	
General oversight	MEC	Non UXO techs follow 3Rs training, don't pick up anything you didn't put down. When in doubt, retreat and report. UXO techs to follow ESS.	L
General oversight	Heat stress	Follow SAHP guidelines for heat stress. Drink plenty of fluids. Take breaks as necessary. Watch yourself and your co-worker for signs of heat stress. Make sure to carry	L

		sufficient drinking water and sports drinks with you. Keep a cooler in the car with cool water bottles and sports drinks. Use physiological monitoring as required by HSP, and document results on physiological monitoring forms.	
General oversight	Cold stress	<ul style="list-style-type: none"> • Be prepared for all types of weather by having cold weather gear (including rain gear) in the field vehicle as weather in the mountains can change rapidly. Dress in layers. • Obtain and review daily weather forecast and adjust work schedule based on work conditions (and driving conditions). • Observe one another for signs of cold-related disorders (see HSP for review of signs and symptoms). • Stay hydrated. Drink 16 ounces of water before beginning work. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours. • Take regular breaks in a warm shelter for cold weather. • Follow the cold stress monitoring requirements outlined in the HASP. • Follow Wind Chill Chart to assist with work warming regiment determination and frostbite avoidance. • Persons who experience signs of cold stress should contact the PM and RHSM. Call the occupational nurse first if symptoms are severe at 1-866-893-2514. 	L
General oversight	Sunburn	Wear a hat and sun screen as necessary. Wear long sleeve shirts and long pants. Use sunscreen every morning before the sun gets hot.	L
General oversight	Injury due to improper use of hand tools (including cuts, strains, flying debris, etc.) Slips, trips, and falls	<ul style="list-style-type: none"> • Inspect all tools before each use. • Complete the Self Assessment Checklist for hand tools • Personnel will be trained in the proper use of hand tools. 	L

		<ul style="list-style-type: none">• All power tools will be energized through a GFCI or double insulated.• Wear proper PPE (safety glasses with side shields, safety-toed boots and work gloves)• Be aware of trip hazards/muddy/slippery surfaces. Maintain secure footing.	
Depart From Site	Traffic, pedestrian, and obstacle hazards	<ul style="list-style-type: none">• Ensure site is clean and nothing is left behind.• Drive defensively, wear your seatbelt, obey all traffic laws, and know the route to site prior to trip.• Be aware of how weather conditions may affect driving safety.	L

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
Fire extinguisher(s)	Fire extinguisher training	Monthly CH2MHILL inspection documented on card, yearly licensed inspector inspection, documented with new card
PPE		Inspect before use
First Aid/Bloodborne pathogen/CPR kit	First aid training/CPR training	Inspect prior to start of job

PRINT NAME

SIGNATURE

Supervisor Name: _____

Date/Time: _____

Safety Officer Name: _____

Date/Time: _____

Employee Name(s): _____

Date/Time: _____

Date/Time: _____

Date/Time: _____

Date/Time: _____

Date/Time: _____

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CH2M HILL Health and Safety Plan

Attachment 11

Material Safety Data Sheets

CH2M HILL Health and Safety Plan

Attachment 12

Deficiency Tracking Log

SAFETY & OCCUPATIONAL HEALTH DEFICIENCY TRACKING LOG

[illegible]

CH2M HILL Health and Safety Plan

Attachment 13

CSIR

☐ Initial Report
☐ Follow-up Report
☐ Final Report
 Date ____/____/____

Contractor Incident Report System (CIRS)

1. Contract Information		Incident Information	
Prime Contractor:	Cage Code:		
Contract Number:	Installation of Incident:		
Task Order #:	Contracting Activity/ROICC Office:		
Contractor Contact Information			
Name (Last, First):	Phone #:		
Email Address:	Date Notified:		
2. Incident Type (Please Check/Bold All That Apply)			
<input type="checkbox"/> Assault/Violent Act	<input type="checkbox"/> Extreme Environmental Exposure	<input type="checkbox"/> Man over the side (No water entry)	
<input type="checkbox"/> Diving	<input type="checkbox"/> Falls, slip, trip, or bodily exertion	<input type="checkbox"/> Man Overboard - Water Entry	
<input type="checkbox"/> Electrical Shock/Burns	<input type="checkbox"/> Fires - All Types	<input type="checkbox"/> Material Handling Equipment	
<input type="checkbox"/> Equipment Installation/Repair	<input type="checkbox"/> Hazardous Material (any type)	<input type="checkbox"/> Ordnance-Related (Explosive)	
<input type="checkbox"/> Explosion, Non-Ordnance	<input type="checkbox"/> Industrial (Select Additional Below)	<input type="checkbox"/> Vehicle (Government or Private)	
Industrial Incident Additional Information (Please Check/Bold All That Apply)			
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Hand and Power Tools	<input type="checkbox"/> Work Platforms and Scaffolding	
<input type="checkbox"/> Demolition/Renovation	<input type="checkbox"/> Rigging	<input type="checkbox"/> Underground Construction, Shafts, and Caissons	
<input type="checkbox"/> Trenching/Entrapment	<input type="checkbox"/> Cranes and Hoisting Equipment	<input type="checkbox"/> Concrete, Masonry, Steel Erection and Residential Construction	
<input type="checkbox"/> Traffic Control	<input type="checkbox"/> Floating Plant and Marine Activities	<input type="checkbox"/> Tree Maintenance and Removal	
<input type="checkbox"/> Welding and Cutting	<input type="checkbox"/> Pressurized Equipment and System	<input type="checkbox"/> Airfield and Aircraft Operations	
<input type="checkbox"/> Control of Hazardous Energy	<input type="checkbox"/> Fall Protection		

4. Fully Explain What Allowed or Caused the Incident:		Incident Information
Direct Cause:		
Indirect Cause:		
Additional Action Taken: (Please Include a Begin Date and Est. End Date in Description)		
Additional Action Taken: (Please Include a Begin Date and Est. End Date in Description) <i>(Use the back of page if you need additional space)</i>		
5. Contributing Factors:		
Was Visibility Restricted? <input type="checkbox"/> Yes <input type="checkbox"/> No		Distance Visibility was restricted:
Unit of Measure (Check/Bold): <input type="checkbox"/> Feet <input type="checkbox"/> Yards <input type="checkbox"/> Meters <input type="checkbox"/> Miles <input type="checkbox"/> Nautical Miles		
Visibility Restricted By: (Check/Bold all that apply) <div style="display: flex; flex-wrap: wrap; justify-content: space-between;"> <div style="width: 45%;"><input type="checkbox"/> Fog</div> <div style="width: 45%;"><input type="checkbox"/> Smoke</div> <div style="width: 45%;"><input type="checkbox"/> Rain</div> <div style="width: 45%;"><input type="checkbox"/> Sleet</div> <div style="width: 45%;"><input type="checkbox"/> Snow</div> <div style="width: 45%;"><input type="checkbox"/> Mist</div> <div style="width: 45%;"><input type="checkbox"/> Dust</div> <div style="width: 45%;"><input type="checkbox"/> Sandstorm</div> <div style="width: 45%;"><input type="checkbox"/> Unknown Object</div> <div style="width: 45%;"><input type="checkbox"/> Other:</div> </div>		
Lighting Conditions at Site of Mishap: (Please Check) <input type="checkbox"/> Adequate <input type="checkbox"/> Inadequate <input type="checkbox"/> Unknown	Was Noise Level a Factor: (Please Check) <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Was Carbon Monoxide (CO) a Factor: (Please Check) <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes CO Alarm Manufacturer:

5. Contributing Factors: Continued	Incident Information
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Other Contributing Factors:

6. Attached Documents

Attached Documents/Files Name/Description:	Date Added:	Uploaded By:

1. Injured Data (if applicable) Person #			
Age:	Gender: (Check/Bold) <input type="checkbox"/> Male <input type="checkbox"/> Female	Prime Contractor Company Name:	Subcontractor Company Name:
2. General Information			
Drug or Alcohol Involved: (Check/Bold all that apply) <input type="checkbox"/> None <input type="checkbox"/> Unknown <input type="checkbox"/> Alcohol <input type="checkbox"/> Drugs <input type="checkbox"/> Alcohol and Drugs			
Who Provided First Aid? <input type="checkbox"/> Onsite <input type="checkbox"/> Base <input type="checkbox"/> Public			
Was Ergonomics a Factor: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No Type of Ergonomic Injury: (Check/Bold All That Apply) <div style="display: flex; flex-wrap: wrap; padding: 5px;"> <div style="width: 25%;"><input type="checkbox"/> Lifting</div> <div style="width: 25%;"><input type="checkbox"/> Positioning</div> <div style="width: 25%;"><input type="checkbox"/> Bending</div> <div style="width: 25%;"><input type="checkbox"/> Equipment Placement Office</div> <div style="width: 25%;"><input type="checkbox"/> Equipment Placement Industrial</div> <div style="width: 25%;"><input type="checkbox"/> Repetitive Motion</div> <div style="width: 25%;"><input type="checkbox"/> Impact Strain</div> </div>			
3. Injury Illness/Fatality Information			
Severity of Injury/Illness: (Check/Bold) <div style="display: flex; flex-wrap: wrap; padding: 5px;"> <div style="width: 33%;"><input type="checkbox"/> Fatality</div> <div style="width: 33%;"><input type="checkbox"/> Lost Workday Case Involving Days Away From Work</div> <div style="width: 33%;"><input type="checkbox"/> Temporary Disability</div> <div style="width: 33%;"><input type="checkbox"/> Recordable Workday Case Involving Restricted Duty</div> <div style="width: 33%;"><input type="checkbox"/> Permanent Total Disability</div> <div style="width: 33%;"><input type="checkbox"/> Other Recordable Case</div> <div style="width: 33%;"><input type="checkbox"/> Recordable First Aid Case</div> <div style="width: 33%;"><input type="checkbox"/> Permanent Partial Disability</div> <div style="width: 33%;"><input type="checkbox"/> Non-Recordable Case</div> <div style="width: 33%;"><input type="checkbox"/> No Injury</div> </div>			
Where There Days Lost: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No	Where There Days Hospitalized: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No	Where There Days Restricted Duty: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No	
Part of Body Affected:			
Nature of Injury or Illness:			
Event or Exposure:			
Source of Injury or Illness:			
General Location Description:			
Injury Activity Code:			

4. License (if applicable) Person #		
Are Appropriate License and Certification/Medical Current: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No Describe or Explain:		
Attach Image of License or Certification Name/Description:	Date Added:	Uploaded By:
5. Training		
Was all the contract-required training provided to the employee: (Check/Bold) <input type="checkbox"/> Yes <input type="checkbox"/> No Explain:		
6. Attached Documents		
Attached Documents Name/Description:	Date Added:	Uploaded By:

[illegible]

4. License(if applicable) **Property Damage**

Are Appropriate License and Certification/Medical Current: (Check/Bold) ☐ Yes ☐ No

Describe or Explain:

Attach Image of License or Certification
Name/Description:

Date Added:

Uploaded By:

5. Training

Was all the contract-required training provided to the employee? (Check/Bold) ☐ Yes ☐ No

Explain:

CONTRACTOR INCIDENT REPORT SYSTEM (CIRS) INSTRUCTIONS
Complete Only Sections Appropriate to Incident (Rev. 03/11).

NOTE: THE ATTACHED CIRS FORM IS TO BE USED BY CONTRACTORS TO RECORD THE RESULTS OF THEIR ACCIDENT/INCIDENTS INVESTIGATIONS AND SHALL BE PROVIDED TO THE CONTRACTING OFFICER WITHIN THE REQUIRED TIMEFRAMES.

GENERAL. Complete a separate report for each person who was injured in the accident pages 5-6. A report needs to be completed for all OSHA recordable accidents and property damage cases. Please type or print legibly. Appropriate items shall be Checkd/Bolded, non-applicable sections shall be marked "N/A". If additional space is needed, provide the information on a separate sheet of paper and attach to the completed form.

Mark the report: (Check/Bold)

Initial: If this form is being used as initial notification of a Fatality or High Visibility Mishap. The initial form is due within 4 hours of a serious accident. A form marked 'Follow-up' or 'Final' is required within 5 days.

Follow-Up: If you are providing additional information on a report previously submitted.

Final: If you are providing a completed report and expect no changes.

Incident Information

Section 1 Contract Information – Incident Information

Prime Contractor: Name as it appears on contract documents.

Cage Code: If known.

Contract Number: Number as it appears on the contract documents.

Installation: Name of installation where incident occurred.

Task Order #: Insert number if applicable.

Contracting Activity/ROICC Office: Enter the name and address of the Contracting Office administering the contract under which the mishap took place (e.g. ROICC MCBH, ROICC NORFOLK, PWC GUAM, etc.).

Contractor Contact Information: (Contractor point of contact information for the individual responsible for completing the form) Self Explanatory

Section 2 Incident Type: Check/Bold most applicable category, if you select Industrial you must Check/Bold at least one additional category from the **Industrial Incident Additional Information Section**.

Section 3 General Information Incident Information

Date of Accident: Enter the month, day, and year of accident.

Time of Accident: Enter the local time of accident in military time. Example: 14:30 hrs (not 2:30 p.m.).

Describe the Accident in Detail in your words: Fully describe the accident in the space provided. If property damage involved, give estimated dollar amount of damage and/or repair costs involved. If additional space is needed continue on a separate sheet and attach to this report. Give the sequence of events that describe what happened leading up to and including the accident. Fully identify personnel and equipment involved and their role(s) in the accident. Ensure that relationships between personnel and equipment are clearly specified. Ensure questions below regarding direct cause(s), indirect cause(s), and actions taken are answered. **NOTE!** Review questions in Section 4 (Fully Explain What Allowed or Caused the Incident - Incident Information) below before completing.

Exact Location of Accident: Enter facts needed to locate the accident scene (e.g. installation/project name, building/room number, street, direction and distance from closest landmark, etc.).

Were Hazardous Material(s) Involved Yes No

If Yes, Explain What Hazardous Materials Were Involved and Why: Check or Bold appropriate block and list name(s) and quantities of hazardous materials spilled/released during the mishap. List why the hazardous chemicals were being used.

Activity at the time of incident: What type of work/task was being performed by the injured when the injury took place or property damage occurred.

Personal Protective Equipment– Check/Bold appropriate items and list PPE which was being used by the injured person at the time of the accident (e.g. protective clothing, shoes, glasses, goggles, respirator, safety belt, harness, etc.)

Section 4 Fully Explain What Allowed or Caused the Incident - Incident Information

Direct Cause(s): The direct cause is that single factor which most directly lead to the accident. See examples below.

Indirect Cause(s): Indirect cause are those factors, which contributed to, but did not directly initiate the occurrence of the accident.

Examples for Direct and Indirect Cause:

1. Employee was dismantling scaffold and fell 12 feet from unguarded opening.

Direct cause: Failure to provide fall protection at elevation

Indirect causes: Failure to enforce safety requirements: improper training/motivation of employee (possibility that employee was not knowledgeable of fall protection requirements or was lax in his attitude toward safety); failure to ensure provision of positive fall protection whenever elevated; failure to address fall protection during scaffold dismantling in phase hazard analysis.

2. Private citizen had stopped his vehicle at intersection for red light when vehicle was struck in rear by contractor vehicle. (note contractor vehicles was in proper safe working condition.)

Direct cause: Failure of contractor driver to maintain control of and stop contractor vehicle within safe distance.

Indirect cause: Failure of employee to pay attention to driving (defensive driving).

Additional Action Taken: Fully describe all the actions taken, anticipated, and recommended to eliminate the cause(s) and prevent reoccurrence of similar accidents/illnesses. Continue in the additional box and or on additional sheets of paper if necessary to fully explain and attach to the completed report form.

Please Include a Begin Date and Estimated Completion Date in Description

(1) Begin: Enter the date when the corrective action(s) identified above will begin.

(2) Est. End Date - Enter the date when the corrective action(s) identified above will be completed.

Section 5 Contributing Factors Incident Information: Check/Bold appropriate items fill in information where required

Other Contributing Factors: Describe in detail any additional contributing factors not listed in previous information provided.

Section 6 Attached Documents: Provide the appropriate information for each document/file attached or uploaded.

Injured Data Person #

Complete Pages 5 and 6 for each injured person At the upper right hand corner of page 5 and 6 differentiate between each person by using a numerical value (e.g. Person #1, Person #, Person #3, etc.)

Section 1 Injured Data: Fill in all applicable information, Check/bold appropriate responses.

Section 2 General Information:

Check/bold appropriate responses

Section 3 Injury/Illness Fatality Information: Check/bold appropriate responses

Part of Body Affected: Enter the most appropriate primary and when applicable, secondary, etc. body part(s) affected (e.g. arm: wrist: abdomen: single eye; jaw: both elbows: second finger: great toe: collar bone: kidney, etc.).

Nature of Injury/Illness: Describes the manner in which the injury or illness was inflicted or produced. It attempts to answer the broad question of “how” work injuries and illnesses occurred. (e.g. Fall, Struck By, Caught By, Repetitive Motion, Rubbed or Abraded By, etc.)

Event or Exposure: Describes what was produced by the injury or illness was produced or inflicted. (e.g. Infectious Parasitic Diseases, Traumatic Injuries and Disorders, Open Wounds, Burns, Intracranial Injuries, etc.)

Source of Injury Illness: Identifies the object, substance, bodily motion, or exposure, which directly produced or inflicted the previously identified injury or illness. (e.g. Acids, Chemical Products, Furniture and Fixtures, Machinery, Structures and Surfaces, Tools Instruments and Equipment, etc.)

General Location Description: Describes where the injury occurred (e.g. Industrial Facilities, Operational Industrial Building Plant , Roadway, etc.)

Injury Activity Code: Describes what the injured person was doing when the injury occurred. (e.g. Operating Type of Equipment, Construction Activity Being Performed, Industrial Operation Being Conducted, etc.)

Section 4 License:

Are Appropriate License and Certification/Medical Current: Did the injured employee have the appropriate license/certification or medical evaluations completed to conduct the work/task being performed.

Describe/Explain: Describe the required (licensing/certification/medical evaluation) for job/task being performed, date when license was issued, and expiration date. (e.g. “Powdered Actuated Tools, Hilti DX-350, License issued 11/29/2011, expires 3-years from issue date.” “Respirator Semi Annual Medical Evaluation, conducted 12/30/2011, expires on 12/30/2013”, etc.)

Attach Image of License or Certification: Self-Explanatory

Section 5 Training:

Was all the contract-required training provided to the employee: Self-Explanatory

Explain: If no, to the previous questions explain why the employee was not trained.

Section 6 Attached Documents:

Self-Explanatory use this for photos, drawings, diagrams, or other relevant documents.

Property Damage

Section 1 Involved Person Data: Fill in all applicable information, Check/bold appropriate responses.

Section 2 Attached Documents:

Self-Explanatory use this for photos, drawings, diagrams, or other relevant documents.

Section 3 Property Damaged:

Check/bold appropriate responses. Other Headings Self-Explanatory.

Section 4 License:

Are Appropriate License and Certification/Medical Current: Did the equipment operator have the appropriate license/certification or medical evaluations completed to conduct the work/task being performed.

Describe/Explain: Describe the required (licensing/certification/medical evaluation) for job/task being performed, date when license was issued, and expiration date. (e.g. “State Issued Driver, License issued 11/29/2011, expires on MM/DD/YYYY)” “Scissor Lift, JLG Model 260MRT conducted 12/30/2011, does not expire.”)

Attach Image of License or Certification: Self-Explanatory

Section 5 Training:

Was all the contract-required training provided to the employee: Self-Explanatory